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AN ANALYSIS OF THE BENEFITS OF ISSUING CONVERTIBLE DEBT IN SOUTH AFRICA: SHOPRITE HOLDINGS LTD CASE STUDY

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UNIVERSITY OF CAPE TOWN



In partial fulfillment of the requirements
of the degree of
Master of Commerce (Financial Management)

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I declare that:

- this work has not previously been submitted in whole or in part for the award of any degree;
- it represents my own work; and
- any substantial contributions to and quotations in the dissertation have been cited and referenced.

Simon Wormald
11 January 2013

University of Cape Town

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1. INTRODUCTION

Over the past 50 years hybrid securities, such as convertible bonds, have proven to play a useful role in the capital structure and financing decisions of firms in the United States (US). Between 1980 and 1985 U.S. firms raised between 6 to 10 percent of their total long term funding through convertible debt (about \$55bn) (Billingsley et al.)¹ while UK firms raised over £19bn in convertible debt². Numerous research papers have discussed the theoretical reasons for why firms would choose to issue convertible debt, the circumstances surrounding convertible debt issues (including the conditions in which they thrive), the theoretical benefits of using convertible debt and make some attempt to reconcile the theory to empirical evidence.

There is considerably less research discussing whether these benefits apply to South African companies. Convertible theory indicates that companies with high growth opportunities and high costs of bankruptcy stand to benefit the most from convertible issues, this is because convertible securities offer more reward to compensate for uncertainty. These benefits, in theory, would make a number of South African companies' prime candidates to benefit from the use of convertible securities. South Africa is an emerging economy with a low sovereign credit rating, however it is the largest and most developed economy in Africa offering a large potential to act as an investment hub for local and international investment into Africa. The high growth opportunities presented here, along with the traditionally high interest rates (relative to the US or European markets) would suggest that the South African market for convertible debt would be well established, balancing investors desire for equity exposure with a lower risk, fixed income component.

On the 22 March 2012, Shoprite Holdings Ltd announced that it would be raising approximately R8 billion of finance through the concurrent issue of R3.5 billion in straight equity and a further R4.5 billion in convertible bonds.

The aim of this paper is to investigate Shoprite's decision to issue convertible bonds despite South African firms tending to favour traditional forms of debt or equity. The paper first revisits the theory on convertible debt to consider the possible reasons for why Shoprite elected to issue convertible debt, and then develops two models, the first to quantify Shoprite's debt capacity and cost of debt, the second to value the convertible bond issue, and quantify the benefit, if any, that convertible bonds achieved as opposed to a straight debt or equity issue.

¹ Randall S. Billingsley, Robert E Lamy, G Rodney Thompson. (1988) The Choice Among Debt, Equity and Convertible Bonds.

² Abhyankar, Abhay. Dunning, Alison. (1998) *Wealth Effects of Convertible Bond and Convertible Preference Share Issues: An Empirical Analysis of the UK Market*. Journal of Banking and Finance.

2. THE SHOPRITE GROUP OF COMPANIES

The Shoprite Group of Companies (Shoprite) represents a diverse range of chain stores operating in retail industries throughout Africa.

The company originally traded as a small chain of eight supermarket stores acquired for one million rand. Thirty three years later the group now trades with “1334 corporate, and 406 franchise, outlets in 17 countries across Africa, bringing the total number of stores in the Group to 1740”, with an estimated market capitalisation of R82 billion³.

The company is ranked as the number one retailer in Africa and the Middle East⁴, and ranked 92nd over all retailers globally⁵. The groups share performance is similarly flattering; in 2009 the stock was added to Merrill Lynch & Co.'s “list of most preferred stocks citing ‘excellent growth’ in sub-Saharan Africa”³ as the reason for their inclusion.

Over the past five years Shoprite’s share price and dividend performance has earned the company a reputation of being one of the best performing stocks on the JSE and the best performing retailer⁶, achieving compound annual growth of 40.5% (adjusted for dividends received). An investment in Shoprite of R10 000 in January 2007 would have been worth R54,722 by January 2012.

Background to the Shoprite Group:

After the incorporation of the original eight supermarkets in 1979, the Shoprite Group began its comprehensive growth strategy that continues to thrive to date. By the end of 1983 Shoprite had grown to 21 stores, and reflected revenue growth of almost 600% over the past four years³.

By 1986 Shoprite was represented in three provinces in South Africa. The company listed on the JSE at a market value of R29 million and within the next two years, Shoprite had successfully expanded into the Gauteng Province, where South Africa’s largest urban population resides.

Shoprite continued growing by acquisition, acquiring both Grand Bazaars and Checkers. By 1991, the group had 241 stores and 22 600 employees².

In 1995, eleven years after incorporation, Shoprite embarked on the second phase of its ambitious growth strategy, becoming the first South African retailer to expand into Africa, opening stores in Namibia, Mozambique and Zambia.

Shoprite’s growth strategy was also focused on creating centralised distribution to improve cost efficiencies and competitive prices. The group acquired a central buying organisation, Sentra which increased its distribution substantially servicing an additional buying group for 550 owner-manager

³ As published on Shoprite Holdings Website: <http://www.shopriteholdings.co.za/pages/1019812640/about-our-company/history.asp>

⁴ Walter Wafula (2008) *South Africa: Shoprite ranked top in Continent, Middle East*. (<http://allafrica.com/stories/200809180146.html>)

⁵ Global Powers of Retailing Report (2012): http://www.deloitte.com/view/en_GX/global/f9f6b21f1d464310VgnVCM1000001a56f00aRCRD.htm

⁶ Business Times: Top 100 Companies (November 2010). http://www.shopriteholdings.co.za/files/1019812640/About-our-company/Sunday%20Times_Top%20100%20Companies%202010.pdf

supermarket members, as well as the Shoprite Group. This allowed Shoprite to enter into smaller markets where the emphasis is on convenience.

In 2000 the Group opened its first supermarkets in Zimbabwe and Uganda and by 2001 Shoprite had opened the first of seven stores planned for Egypt, while developing stores in Malawi and Lesotho.

Shoprite also acquired supermarket groups in Madagascar and Tanzania, both consisting of stores and distribution centres, all of which were rebranded. The extensive growth by acquisitions strategy was exhausting capital reserves and in 2002 Shoprite listed on the Namibian stock exchange and then listed on the Zambian stock exchange in 2003.

From 2003 to 2005 the group also began the roll out two new brands, *Usave* (located in Ghana and Angola) and Shoprite Liquor Stores, while acquiring Computicket and Transfam. This enabled the group to expand its sales from traditional retail, to include liquor, pharmaceuticals and presold tickets (tickets are sold for a range of items including entertainment events and flights).

In 2006, Shoprite was forced to pull back slightly, closing its operations in Egypt citing that the ongoing restrictions on retail were causing the venture to be unprofitable. The closure resulted in losses R19,9 million².

In December 2007 Shoprite announced an investment of US\$80 million into the Democratic Republic of Congo (DRC) for the development of two world class supermarkets in the major cities of Lubumbashi and Kinshasa². Construction was anticipated to end by mid 2009, however by April 2012 only the Kinshasa store had been completed and launched. The delay signifies the difficulties involved with expansion into Africa. At this stage Shoprite was still the first South African retailer to own a store in the DRC.

In March 2011 Shoprite announced that it would acquire Metcash Trading Africa (Pty) Ltd. Metcash “includes franchise arrangements with franchisees operating retail stores under popular registered trademark names throughout South Africa, such as Friendly, Seven Eleven and Price Club Discount Supermarket”³. The store formats provided diversification to Shoprite’s traditional super market format, bringing more convenience stores and discount supermarkets to the group.

On the 22nd March 2012, Shoprite announced that it would sell a combination of straight equity and convertible bonds to raise funds of approximately R8 billion (US\$1 billion) to bolster its balance sheet. The capital was planned to be raised through the issue of R3.5 billion straight equity, at R127.50 per share (an approximate discount of 6% on market value) and R4.5 billion in convertible bonds.

Future Expansion:

During February 2012, one month before the announcement of the concurrent equity and convertible bond issue, Shoprite’s half year earnings and expansion plans were announced. By the end of June 2012, Shoprite planned to have completed 12 new stores in Nigeria and the DRC⁷. Despite high trade barriers and supply challenges Shoprite’s CE Whitey Basson indicated that the company was expected to continue its strong performance, having reported an 18.6% rise in profits

⁷ Zeenat Moorad. (February 2012) *Shoprite profits up, remains bullish on Africa*.
<http://www.bizcommunity.com/Article/237/182/71175.html>

for the first 6 months ended of the 2012 financial year⁸, as economists forecast Africa's consumer spending to hit US\$1.4 trillion by 2020, with GDP growth estimated to be stable at around 5%⁶.

Shoprite opened 59 new stores in the first half of its 2012 financial year and announced its intention to add a total of 174 new stores by June, representing a commitment to expansion of more than R1.1 billion⁶.

Exchange Rate Exposure:

Shoprite's operations remain largely South African focused. "Its core business, Supermarkets RSA, grew sales by 12.3% to R32.031 billion and trading profit by 16.8% to R1.788 billion while Shoprite's total turnover grew 13.2% to R41.054 billion after the group increased prices by an average of 4.6%"⁶.

The relative weakness of the rand against the main African currencies from June to December 2011 improved results for the group. Shoprite had 123 supermarkets in 15 countries outside SA, benefiting from the weaker rand, reflecting sales growth of 21.2%. At constant currencies these stores grew revenue by 16.9%⁶.

This resulted in Shoprite earning an exchange-rate gain of R27.7 million, compared with a loss of R13.4 million a year earlier. The gain represents 1.5% of the group's trading profit.

Difficulties in Africa:

The main challenge facing Shoprite from an African perspective is captured in a report released by the World Bank⁹. The report examines the barriers that stifle cross-border trade within Africa, and revealed that Shoprite spends approximately US\$20,000 a week on import permits transporting fresh produce to its stores in Zambia alone. The administration costs apart from the cost of the permit can be damaging to profits. The report further noted that "for all countries it operates in, approximately 100 single entry import permits are applied for every week; this can rise up to 300 per week in peak periods. As a result of these and other requirements, there can be up to 1,600 documents accompanying each truck Shoprite sends with a load that crosses a border in the region."

Competition in Africa:

Walmart's bid to acquire 51% of Massmart was eventually approved in 2011. The intention of the acquisition was to allow Walmart a foothold into African retail. Shoprite's decision to raise capital of R8 billion seems to have been taken in response to Walmart's arrival. Walmart is anticipated to bring fierce competition to Shoprite. The US retail giant is renowned for its financial power and competitive pricing strategy, going by the mantra "Everyday Low Prices". Shoprite's CEO announced that the new capital would be used to accelerate expansion plans in SA and the rest of Africa in terms of new stores and infrastructure, specifically to obtain trading premises, however another

⁸ Shoprite earnings up 18.6% to 280.8c. (February 2012):

<http://www.bizcommunity.com/Article/196/182/71125.html>

⁹ Brenton, Paul and Gozde, Isik. (2012) *De-Fragmenting Africa: Deeping Regional Trade Integration in Goods and Services*. Report published: <http://www.worldbank.org/defragmentingafrica>

possible use of the funds could be to invest in lower prices through the roll out of longer lasting promotions¹⁰.

Over the period of June to December 2011, the group's internal food inflation was on average 5.0% compared to an official food inflation figure estimated at 9%¹¹, indicating the extent Shoprite is currently absorbing cost increases rather than risk its low price reputation.

Additional competition has been identified from local retailers. Pick 'n Pay which has just over 40 stores outside of SA, has planned to open as many as 100 stores in the next four years⁶. It is believed that the major competitive tipping point for Shoprite will come in securing sites to establish stores ahead of their competitors, as retailers have indicated that their major delay in African expansion has been caused by a difficulty in securing quality sites.

The Race for Primary Sites:

Shoprite's major difficulty in expanding into Africa has been identified as their struggle to find suitable sites for new store development.

The Commitment Economy, an independent global survey of over 39 000 people in 17 markets, reported that the competitive pricing and the convenient locations of Shoprite's 1 520 stores gives them their competitive advantage¹². The survey found that 12% of Shoprite's market share (equivalent to R28 billion) comes from consumers ambivalent to brands, but who shop there for practical reasons.

The introduction of Walmart will increase competitiveness around both retailers' prices. However despite the inevitable price war caused by Walmart's stronger buying power, Shoprite's first mover advantage into Africa affords them the luxury of first choice when it comes to obtaining suitable sites for store development.

Shoprite's need to raise additional capital could likely be driven by the need to buy up prime retail sites in Africa. Shoprite's investment in property developments affords it the ability to act as the anchor tenants in major malls and block competition stores from entering the centre.

¹⁰ Zeenat Moorad. (March 2012) *Gloves off as Shoprite readies for Wal-Mart war.*
<http://www.bizcommunity.com/Article/196/182/72820.html>

¹¹ *Shoprite turnover up 13.2% to R41.1bn.* (January 2012)
<http://www.bizcommunity.com/Article/196/182/69427.html>

¹² Gillian Abrahams. (July 2012) *Shoprite shows that convenience is King.*
<http://www.advantagemagazine.co.za/shoprite-shows-convenience-king/>

3. LITERATURE REVIEW:

WHY ISSUE CONVERTIBLE DEBT AND WHAT ARE THE ALTERNATIVES?

3.1) INTRODUCTION TO CONVERTIBLE DEBT

Convertible debt is a form of fixed income security that can be converted at the option of the holder into the equity of the same company. The investor receives both a relatively safe, fixed return on the bond component and holds an option on the stock price, providing for potentially greater returns should the stock perform. The sale of conversion instruments provides numerous benefits over traditional debt or equity, the primary benefits concerning companies are typically that the convertible bond can be sold at a lower coupon rate to straight debt, due to the value of the conversion option received.

Both the value of the bond and the value of the option are affected by the volatility of the issuing firm's cashflow generated from earnings. The more volatile these cashflows are, the greater the risk to the investor and as a result, the higher the return required. By the same notion, the greater the volatility of the firm's cashflows, the greater the value of the option as there is increased likelihood of conversion.

The increased risk on the bond typically offsets the increased value on the conversion option, making convertibles a favourable source of finance to companies with volatile cashflows. It is possible that as this risk increases, the enhanced value on the option more than offsets the discount on the value of the debt, as a result the interest rate may not increase with firm risk, but potentially decrease. This is what is referred to as the sweetened debt theory. The sale of the conversion option helps market what would otherwise be considered unattractive or overpriced debt. High risk companies may be unable to sell debt, and feel that their equity is considerably undervalued, could elect to issue convertibles, the option characteristics making them a more attractive alternative in the market place.

The benefit of convertibles to investors is that the package provides the investor with exposure to equity markets and fixed income markets simultaneously. If the value of the stock rises the value of the convertible is determined by its conversion value, however if the stock price drops, the investment's minimum value is capped at the value of the straight debt (in the absence of default risk).

Assuming a company issued a five year convertible bond of R1000 with a 6% coupon rate, while the current market yield was 8.5%. If the conversion value was zero, the minimum value of the investment would be limited to the discounted price of the bond (the value of the straight bond component).

Discount Rate (Market Yield)	8.50%					
Years	0	1	2	3	4	5
Principle						1000
Coupon		60	60	60	60	60
Total	0	60	60	60	60	1060
<i>Discount Factor</i>	<i>1</i>	<i>0.921659</i>	<i>0.849455</i>	<i>0.782908</i>	<i>0.721574</i>	<i>0.665045</i>
Present Value of Cash Flows	0	55.30	50.97	46.97	43.29	704.95
Net Present Value of Bond	901.48					
Issue Price	R	1,000.00				
Bond Value	R	901.48				
Option Value	R	98.52				

In this example the company has been able to issue bonds at a discounted coupon of 250 basis points over the prevailing market rate. Had the share price after five years exceeded the conversion value, the value of the principle payment would have reflected the conversion value rather than the face value of the bond.

Conversion Ratio:

The conversion ratio is determined as the number of shares that one bond will convert into. To determine the conversion ratio, we divide the face value of the bond by the conversion price. The conversion price is the predetermined share price that the stock must reach in order for conversion to take place (the exercise price). What this means essentially is that the current market price of the common stock, multiplied by the conversion ratio determines the convertibles current conversion value. The conversion premium is the percentage premium that the conversion price is set above the current stock price. Van Horne¹³ indicates that conversion premiums have historically been in the range of 10 to 25%, high growth companies occur in the upper part of the range, and could extend to as much as 30%. Billingsley and Smith (1996)¹⁴ found that the mean conversion premium for their survey conducted over 88 US firms that had issued convertible securities between 1987 and 1993 was 19.42%. In contrast to this, during 2012 there were three major convertible issues made by listed South African firms all three issues included conversion premiums of above 30%, the largest premium being 35%¹⁵.

A conversion feature (without early conversion rights) is effectively a European style call option on the firm's equity. What is particularly unique about this call option is that unlike regular call options the style of the conversion feature behaves like a warrant. Warrants are typically longer term (5 to 10 years) options on the company's equity, and typically warrants are settled with a fresh equity issue.

¹³ Van Horne, James C. (2001) *Financial Market Rates and Flows*. 6th Edition. Stanford University, New Jersey.

¹⁴ Billingsley, Randall S and Smith, David M. (1996) *Why Do Firms Issue Convertible Debt?* Wiley-Blackwell.

¹⁵ During 2012 there were 3 significant convertible bond issues by listed firms in the South African market. These were Steinhoff, JD Group and Shoprite. Steinhoff has consistently issued convertible bonds denominated in Euros from 2010 to 2012. All of their issues had maturities of 5 to 10 years, coupon rates of between 5.625% – 6.375% and had an initial conversion premium of 30% to 35%. The 2012 issue was for the equivalent of R4.3bn. The convertible issue from JD Group (part owned by Steinhoff) was to raise funds of R1bn, with a maturity of 5 years and coupon rate of between 7% and 7.5%. The conversion premium on this issue was 32%. Shoprite's convertible issue was set at an initial conversion premium of 32.5%.

The difference between these two features is that the issue of a warrant has dilution implications for existing shareholders. Warrants are generally issued with bonds as sweeteners to encourage the market to take up the lower coupon rate however when a straight bond is issued in conjunction with a warrant, the warrants are stripped from the bonds and traded separately, unlike convertibles where the two features are inseparable.

Conversion features become slightly more complex than warrants when they are offered with early conversion rights. While warrants are only exercised at the exercise date, similar to European style call options, most convertible bonds contain an early exercise clause, either at the option of the issuer or the holder or both. These clauses allow either the investor or issuer to recall the convertibles prior to maturity, which makes the conversion feature more similar to an American style option.

The early exercise feature is an important and commonly exercised feature with convertible instruments. Asquith's (1991)¹⁶ research of convertibles between 1980 and 1983 showed that 79% of convertibles were callable after a median protection period of 252 days, 21% of convertible issues were callable from the issue date.

Other benefits pertaining to convertible issues experienced in American and European markets is the fact that long term call options cannot be obtained in the open market. Typically an investor who wishes to acquire a long term call option on a particular stock would need to acquire a short term option and continuously roll it forward at each vesting date.

This would erode returns through administrative effort and transaction fees, which would not feature had a long term option been available, thus part of the reason for issuing convertible debt (or warrants), is thought to be an attempt to capture the market of investors that have a positive long term outlook for the company, and wish to acquire long term call options (Gemmill, 1993)¹⁷.

Subordination:

While it depends on the nature of the agreement, convertible bonds are typically subordinate to all other debt classes present on the balance sheet. What this means is that in the possible event of default, the convertible bond holders claim would only be paid out from the remaining proceeds from liquidating the firm's assets after all other debt claims have been settled, but before any equity holders receive liquidation dividend. The reason for this provision is to exploit the inherent riskiness caused by the volatility of the firm value. This is discussed further under 3.2.1: Sweetened Debt Theory.

Redemption at the option of the Issuer:

Typically the firm issuing the convertible bond retains the right to redeem the bond at an arranged price, once certain conditions have been met, prior to the original maturity date of the instrument. This is an important feature as the issuer effectively has the ability to force conversion of the bonds into equity when the conditions are favourable.

¹⁶ Asquith, Paul. (1991) *Convertible Debt: A Dynamic Test of Call Policy*, Working Paper (Sloan School of Management, MIT, Cambridge, MA)

¹⁷ Gemmill, Gordon. (1993) *Options Pricing – An International Perspective*. McGraw-Hill. Berkshire, Endland.

In theory a firm would always want to force redemption at any stage when the current share price exceeds the conversion value, provided that the dividends declared on common stock, are less than the after tax cost of the coupon paid on the convertible. For example, if a convertible bond is issued for R100 and the conversion value rises to R105, the company would want to evoke the redemption, to pay the bond holder out at R100. However the redemption clause cannot force the holder into electing cash, at any stage when the company evokes an early redemption, the holder is entitled to elect either the option to convert the outstanding principle to shares (at the conversion value) or to receive the principle in cash. From the example above it can be seen that if the company were to announce the redemption of the convertibles, the holder would have the option to receive R100 in cash or to convert the principle into shares at a conversion value of R105. Clearly under this scenario the holder would elect to convert the principle to shares to realise the value of R105. Thus the ultimate effect of the early redemption, evoked by the issuer, is to force conversion of the principle into equity.

The reasons for this feature are to protect the issuer against cashflow concerns and allow the issuer to save on paying future coupons. The early conversion feature also allows the company to convert the issue early, to allow for future financing issues on the horizon for new investment opportunities identified.

Evidence has shown that companies do not choose to recall their convertibles as soon as they are in the money (Brealey and Myers, 1991¹⁸; Brennan and Schwartz, 1986¹⁹; Dunn and Eades, 1989²⁰). This is possibly because should management try force redemption at a conversion rate only marginally in the money, holders could be inclined to elect the cash option, in anticipation of a stock price decrease, thereby causing a larger cash constrain on the company. However this is highly unlikely as conversion announcements are largely anticipated by the market and therefore redemption calls tend to be priced into the current share price. This is particularly true of South African capital markets where hedge funds are well established to take advantage of temporary mispricing.

Studies by Brennan and Schwartz (1986) and Dunn and Eades (1989) have shown that companies tend to wait until their convertibles are some 30% to 40% above the recall value before evoking redemption, and forcing holders to elect to convert to ordinary shares.

Redemption at the option of the holder:

While rare, some convertibles may even include a clause which entitles the holder to the right to sell the instrument back to the issuer at a set price at a given date. This is used as added incentive to encourage investors to take up the instruments. The effective put option means that investors are guaranteed a minimum return. At the predetermined dates, the holder can choose to either continue to hold the instrument or redeem it. These redemption values would be significantly low and act as a minimum guarantee to the investor rather than a favourable circumstance. This allows the investor more flexibility, as the companies issuing these instruments have so far been categorised as high risk companies asking investors to place faith in their intangible growth prospects is clearly risky for investors.

¹⁸ Brealey, R and Myer, S. (1991) *Corporate Finance* (4th Edition). McGraw-Hill, New York.

¹⁹ Brennan, M and Shwartz, E. (1986) *The Case for Convertibles*. Chase Financial Quarterly, 1, 27-46.

²⁰ Dunn, K and Eades, K. (1989) *Voluntary Conversion of Convertible Securities and the Options Call Strategy*. Journal of Financial Economics, 23, 273-301.

These terms help facilitate a less risky platform for investors to join at, this is considerable useful for turn-around companies during economic crisis or for companies situated in emerging markets.

3.2) THEORETICAL EXPLANATIONS FOR ISSUING CONVERTIBLE DEBT

3.2.1) SWEETENED DEBT THEORY

In the US, studies have found that convertible debt is generally used more by companies with higher borrowing costs. Billingsley and Smith (1996)²¹ found that of the convertible issues included in their sample, only 23% of these issuers were rated by Moody's as investment grade, the remaining 77% being either below investment grade or unrated. This finding suggests that companies view convertible debt's greatest advantage to be the discounted rate paid on raising new finance.

Bonds issued by companies that are rated below investment grade, are referred to as junk bonds due to the high risk attached to the investment and are associated with exceptionally high yields to compensate investors for this risk.

Companies that are rated as investment grade receive more favourable terms on debt financing and have access to larger portions of the debt markets as many investors are restricted by mandate from investing in companies below investment grade. The implication is that firms have significant costs associated to their credit rating and have shown that maintaining investment grade status is crucial to their financing decisions. Companies at investment grade level would favour convertible issues as it allows the company to enjoy the short term benefits of debt, while converting to equity in the long run would protect their credit ratings. Companies below investment grade are subject to relatively higher yields due to the higher risk and their limited access to smaller debt markets.

Companies considering debt finance are concerned broadly with the following two criteria: does the company have further capacity for debt without significantly increasing costs of financial distress, and secondly what is the lowest incremental rate of borrowing that the company can achieve in the debt market.

The cost of financial distress is considered to be a combination of the likelihood of default and the potential cost to the investor should the default occur. The indicators of financial distress then can be viewed as impacts of debt on liquidity and cashflows (the likelihood of going bankrupt) and the level of subordination of the debt in the event of default.

Bonds are issued such that if the market rate charged is in excess of the coupon rate, the bonds are issued at a discount. The sweetened debt theory relies on this market pricing mechanism. A company with high costs of financial distress can issue a bond at a coupon rate below the market rate for similar debt. In the case of a straight bond this would mean that the company issues at a discount and receives substantially lower funding on issue, however the issuing of convertibles is different. The investor receives the bond and the conversion feature. The value of the bond and the conversion feature must add to the price that the convertible is issued at. Therefore a company can

²¹ Billingsley, Randall S and Smith, David M. (1996) *Why Do Firms Issue Convertible Debt?* Wiley-Blackwell

issue convertibles with coupon rates significantly lower than the market yield on similar corporate bonds, to the extent that the discount on the bond issue equals the value of the option.

The sweetened debt theory seems to be a strong motive for the issuing of convertible debt. As mentioned earlier 77% of convertible issuers in Billingsley and Smiths survey were below investment grade, meaning that their straight debt alternative would have been high yield 'junk bonds'. In 1985 Billingsley et al. found that firms issuing convertible debt save on average 50 basis points in comparison to relatively similar straight debt issues. In South Africa this margin appears to be in the range of 200 to 300 basis points²².

3.2.2) DELAYED EQUITY THEORY

The major alternative argument for why companies issue convertible debt, is that convertible securities create a mechanism for issuing delayed equity, at a higher price, reducing the effect of dilution and effectively gaining more value for the existing shareholders.

The problem with the sweetened debt theory is indirectly highlighted by Stein's (1992)²³ argument for delayed equity, if a firm's costs of financial distress are too high to safely issue straight debt then a convertible issue would only be issued, if the firm's management were confident in the likelihood of conversion. Stein infers that the issue of convertible debt contains information content; management would have no incentive to issue convertible debt unless they have valuable private information, if management know that conversion is unlikely it would be more beneficial to issue straight equity.

It can be argued that new equity could be raised on the maturity of the unconverted bond to service the principle, however the signalling content of this, in light of a failed conversion issue could cause more harm than good. Secondly, the after tax coupon payment made by the company is likely to be in excess of the common stock dividend (if any) and therefore the value gained from delayed equity would have to outweigh the higher coupon payments made.

Companies with valuable private information may need funding to convert those opportunities into value. In the case of a straight equity issue the value of the new opportunities is transferred to the new shareholders as the shares are issued at the undervalued price. Delayed equity provides the opportunity for firms to fund new investment opportunities and retain part of the investment value for existing shareholders, through issuing the convertibles at a conversion premium.

The issue of firms holding valuable information, withheld from public markets and resulting in the under pricing of securities is commonly referred to as information asymmetries. Firms that suffer from information asymmetries find conventional equity issues unattractive as they do not value the private information similarly it is argued by Stein that these companies favour convertible issues. This is supported by Billingsley and Smiths (1996) survey that revealed a positive relationship between convertible issues and managements opinion about the firm's equity value. Firms that had

²² Based on the convertible issues of Steinhoff, JD Group and Shoprite, it appears that the coupon rate largely approximates the risk free rate and therefore the firms obtain a discount equal to their full credit spread. For these listed companies credit spreads typically range between 2% to 3%.

²³ Stein, Jermy C. (1992) *Convertible Bonds as Backdoor Equity Finance*, MIT, Cambridge, MA.

indicated that equity was their primary alternative to convertibles, also responded positively to the belief their stock was undervalued at the time of the convertible issue.

The announcement of convertible debt should have smaller negative returns than that which would have occurred if the company announced a straight equity issue. In the instance where a company is nearing its debt capacity and shows signs of requiring funding, a convertible issue should be greeted with a slightly positive stock return, as both straight debt and equity would have yielded worse results for stock holders, raising no funding would have been even worse still.

Stein summarises firms behaviour around issuing convertible securities in three simplified scenarios. There are *good*, *medium* or *bad* companies. These categories indicate the firms quality of cashflows, good firms receive high cashflows with certainty, medium firms receive high cashflow with moderate probability and bad firms receive high cashflows with low probability.

The purpose of these characterisations, is to logically assume the circumstances that the companies find themselves in and follow the thought process of management that leads to their decision to issue convertible securities. Stein concludes that *good firms will always issue debt to invest in an opportunity, bad firms will issue a fraction of the investment value as equity and invest and, medium firms will issue convertibles and invest.*

There is no incentive for any of the firms to mimic being the quality of another firm. A firm pretending to be of superior quality would risk high probability of going bankrupt, while a firm pretending to be of lower quality would be underselling itself.

Stein concludes that assuming that the costs of financial distress outweigh the benefit of issuing a mispriced security, then an investor can interpret the decision of management to issue a certain type of finance, as information about whether management view their companies cashflow quality as good, medium or bad.

Another strategy to achieve the same separation of firms between good, medium and bad without using convertibles could for medium firms to issue short term debt, and then refinancing that debt with an equity issue.

The issue with this strategy is that information asymmetries do not just disappear when the firm is required to refinance its short term debt with equity. When the short term debt has matured and the firm is required to capitalise the debt with equity, there is no guarantee that the stock will be correctly priced. From managements perspective, new private information will always exist and the prospect of an equity issue will continue to be unfavourable. The convertible issue allows the firm to better time the market by allowing the company to exercise the conversion early. The firm then has the flexibility to convert the bonds at any time over the duration of the bond, when it is most ideal for the company.

A study by Pilcher (1955)²⁴ asked management of recent convertible issues whether the motive for the issue was as a sweetener to the debt or as a basis to issue 'delayed equity'. The responses were overwhelmingly, 82% of respondents indicated delayed equity as their motive, 18% choosing the

²⁴ Pilcher, James C. (1955) *Raising Capital with Convertible Securities*, Michigan Business Studies No 21/2 (University of Michigan, Ann Arbor, MI).

sweetened debt option. Brigham (1966)²⁵ found similar responses, 73% of respondents selecting delayed equity, 27% motivated by sweetened debt. Brigham also asked why convertibles were elected over straight equity issue, 68% of the respondents indicated that they expected the share price to increase over time, thus delayed equity was used to capture more of the equity value perceived by management to be available in the future. These results were confirmed in Hoffmeister (1977)²⁶.

In contrast, Billingsley and Smiths (1996) survey indicated that while the traditional motives for issuing convertible debt were still very much intact as firms motives were equally divided between debt sweetener and delayed equity theories. However when respondents were asked to rank the factors of influence in order of importance, issuing convertibles as a debt sweetener was the far more popular motive, the second and third ranked influences was more evenly split over the motives of achieving delayed equity, and management considering the current stock price to be undervalued. Even if the second and third motives are accumulated (as they are relatively linked to each other), the combined responses only accounts for 39% of the respondents primary motive, compared to the 48% of respondents that ranked the debt sweetener as their primary motive.

Stein concludes that companies needing to raise funds to finance new investment opportunity could find that convertible debt provides an attractive middle ground between the costs to companies for raising equity under the effects of negative information asymmetries and issuing debt, where there are ensuing costs of financial distress. A company that has the necessary growth potential can use convertible debt, as a mechanism of raising equity finance, while preserving more of the identified growth value for existing shareholders.

3.2.3) FACILITATING OPTIMAL CAPITAL STRUCTURE (DEBT VERSUS EQUITY)

The Debt/Equity Dilemma

In order to appreciate fully the benefits of convertible debt, it is useful to revisit the traditional alternative financing options. There are numerous theories as to why companies choose debt, equity or hybrids sources of finance, however none of these theories are able to explain all capital structure choice, merely what drives company's decisions under certain circumstances.

There are two traditional strategies described as the driving force behind determining a firm's capital structure composition. Myer (1984)²⁷ concludes that neither strategy succeeds in explaining the actual financing decisions firms make, however for the purpose of analysing the benefits of convertible debt, the merits of both theories will help to understand the underlying concerns of management.

²⁵ Brigham, Eugene. (1966) *An Analysis of Convertible Debentures: Theory and some Empirical Evidence*, Journal of Finance. 21, 35-54.

²⁶ Hoffmeister, Ronald J. (1977) *Use of convertible Debt in Early 1970's: A Revaluation of Corporate Motives*, Quarterly Review of Economics and Business. 17, 23-32.

²⁷ Myers, Stewart C. (1984) *The Capital Structure Puzzle*, Journal of Finance vol.39, No 3. San Francisco, CA.

Financing Decisions are broadly categorised as either following one of the two strategies:

1. Static Trade-off Theory
2. Pecking Order Theory

Static Trade-off Theory (STT)

The static trade-off theory states that a firm can maximise its value by leveraging itself at its optimal debt ratio. At this ratio the maximum benefit from borrowing is obtained, with the lowest level of associated cost. The reasons for this is that a firm can borrow debt at a cheaper rate than it can raise equity, because of the tax benefit. This means that the more debt a firm borrows, the higher the value of the firm, however every firm reaches a point where the increase in debt translates into an increase in bankruptcy risk. STT is the act of balancing the value of the interest tax shield against the cost of bankruptcy risk, finding an optimal position where firm value is maximised.

The amount of debt taken on by the firm is limited by the costs of financial distress, the greater the firm is leveraged, the greater the risk of bankruptcy. Similarly the cheaper a firm can obtain debt financing the greater the value achieved by the firm, because of the lower discount rate and also the greater number of positive NPV projects that will be accepted that add value to the firm.

The relevance of this, is that the determination of a firms optimal capital structure is largely dependent on what stage of development the company is in. Firms that are in a high growth stage will want to borrow less, to maintain excess borrowing capacity in order to take advantage of growth opportunities as they arise in the future. Mature firms with less growth opportunity will want to borrow more, as the value of the tax shield outweighs the benefit from preserving future borrowing capacity.

Growth firms are typically deemed higher risk as their cash flows are more volatile, there is large investment and potentially slow initial cash inflows. Furthermore most of the value of these companies sits in their intangible assets, strong brand names, innovative management and strong positions to grow however these assets are not established, they have not begun to generate consistent cash flows and are typically not entirely priced into the equity value by the market (due to asymmetric information).

Growth firms tend to be higher risk and are more capital intensive to fund growth, while at the same time these riskier firms want to borrow less to preserve excess borrowing capacity. As a result growth firms appear to contain many of the attributes that make convertible debt so attractive. Additionally a company in the early development stage, with high growth opportunities would need to constantly replace debt with equity in order to preserve or restore excess borrowing capacity to take advantage of future growth opportunities.

Pecking Order Theory (POT)

Pecking Order Theory states that a firm will always prefer to use internal finance over external finance. When faced with the financing decision firms first set their dividend payout to allow the firm to reinvest as much retained profit as necessary to accommodate the financing of future investment opportunities. If the financing requirements exceed the retained funds available, the firm will first reduce its cash holdings or liquid investment assets, before finally turning to external finance. Once a

firm decides to use external finance, the cheapest and safest securities are used first, namely debt, followed by convertible instruments and as a last resort, new equity.

The reason for preferring internal finance is largely a function of information asymmetries. Firm's that hold private information about the value of future investment opportunities and the cost to the firm if those opportunities are foregone, will know at what cost financing needs to be raised. Internal financing is considered the cheapest form of financing as it negates the need to make private information public, which could result in significant loss of competitive advantage, and could potentially result in losing out on some growth opportunities to competitors.

External financing is also considered less beneficial than internal funding due to the higher cost of capital. External financing comes with high costs of legal, administrative and underwriting procedures, which drive up the required return to service this funding. Furthermore, due to the higher cost of funding, investments with positive NPV's could be rejected because the incremental cost of capital results in a negative NPV while based on the weighted average cost of capital, the investment would add value to the company.

So in addition to the higher costs associated to external financing, and the loss of competitive advantage, internal financing also encourages the correct management behaviour, by accepting all positive NPV projects, irrespective of the incremental cost of financing, maximising the firms value.

POT follows a very different approach to STT. There is no optimal debt level to maximise firm value, rather the funding available is used up in order of preference, as a result the firm's capital structure is a reflection of its accumulated requirements for external finance, and its accumulation of investment opportunities.

The problem found with both STT and POT is that they fail to explain financing decisions such as the timing of equity issues. This is a vital question to understanding why firms would issue convertible debt. It first needs to be understood why a firm would want to issue debt or equity, as convertibles are merely an alternative to this.

Intuitively, management would only be willing to issue stock if the market is correctly valuing, or over valuing, the share price. Issuing undervalued equity results in the dilution of existing shareholder returns. However under POT the correct time to issue equity is only when all other sources of financing are exhausted. Under STT the correct time to issue equity is when the company's debt ratio has exceeded its optimal position and equity is required to balance the position. Neither theory suggests management's agenda, that a firm should only issue equity when the share price is appropriate. This introduces the benefit of convertible securities into the debt/equity decision. In terms of both POT and STT there are situations where the firm will be required to issue equity, and neither situation considers whether the pricing of an equity issue is appropriate. The use of convertibles allows a firm to issue a form of delayed equity, the conversion premium would allow the firm to charge a premium typically in the region of 15 to 30 percent. Thus the decision to issue convertible securities could be considered to be a form debt/equity decision, but allowing for the flexibility to time the equity market better.

The alternative approach to allow firms to follow a POT or STT strategy and still issue equity at appropriate market prices is to consistently issue small tranches of equity at opportune times in the

market to reserve debt capacity. As reasoned by Myers (1984)²⁸ a firm can avoid the investment dilemma by shifting firm's capital structure so that debt financing is always required. This means that companies would always look to raise debt finance, when external finance is required. This would be in line with STT as the firm would be raising debt finance to move towards its optimal capital structure, while appropriately employing the investment decision. The approach is also in line with POT as debt financing would be used in preference to equity.

In order for a firm to constantly operate just below its optimal debt ratio, the firm should regularly issue small tranches of equity by retention, preserving flexibility in the firm's debt capacity. This is referred to as building financial slack. By maintaining lower dividends, building cash reserves and issuing equity when inside information is low and stock prices are relatively well priced, firms can reduce the issues around the disinvestment incentive.

Companies that have not been managing their frequent equity issues could find themselves in the position that their debt capacity is exhausted and issuing equities that are undervalued would result in a large dilution of existing stock holders returns. Convertible securities allow issuers to recover some of this diluted value, through a higher priced conversion mechanism.

However, the issue created from building up reserves in the form of cash and liquid investments is that it becomes an inefficient employment of capital as these yield very low returns. Management are incentivised to invest these funds in any investments yielding a higher return, despite the fact that these returns could be lower than the WACC, destroying shareholder value. This is known as the over-investment problem. To ensure efficient use of capital managers look to return any capital earning sub-par returns in the form of dividends.

Rather than companies having to gradually build-up equity finance when it is not needed and inefficiently investing these funds, the use of convertible securities can lower the cost of sequential financing of equity when it is needed by charging a conversion premium, therefore reducing the amount of equity build up required by management.

Baxter and Cragg²⁹ found that companies displaying high leverage, high P/E ratios and low total assets (relative to firm size) showed an increased probability of issuing equity. This supports the conclusion that companies issuing equity do so to free up debt capacity, or have exhausted their borrowing capacity.

The fact that these companies have low total assets (and specifically low fixed asset percentages of total assets) indicates the firm have smaller debt capacities. Firms with greater tangible asset values are able to pledge these as collateral, making debt cheaper and more available. The fact that firms seem to issue equity when P/E ratios are high also seems to indicate that firms issue equity during periods of favourable stock performance, supporting the conclusion that firms issue equity when stock prices are favourable, not necessarily when the firms require financing.

²⁸ Myers, Stewart C. (1984) *The Capital Structure Puzzle*, Journal of Finance vol.39, No 3. San Francisco, CA.

²⁹ Baxter, N.D. and Cragg, J.D. (1970) *Corporate Choice Among Long-term Financing Instruments*, Review of Economics and Statistics. Pp.225-235

3.2.4) ISSUING EQUITY AND STRUCTURING CONVERSION PREMIUMS:

As discussed by Stein typically a firm's management will know more about the firm's true assets value and the value of opportunities than investors will. Management will often view potential equity issues as being underpriced, increasing the cost of equity to the firm, causing managers to neglect further value adding investments.

Myers argues that so long as management consistently stick to the investment rule, the shares that investors buy will be correctly priced on average. By average, Myers means that there is likely to be under or over pricing in the old equity share price and the new issue price. But the combined equity price after the issue is typically the equilibrium share price.

If management have inside information that is valuable, and intend to act in the interests of existing shareholders, they might refuse to issue new shares even if this means passing up a good opportunity, if the value of equity that could be obtained would pass all the benefits to the new stock holders and not derive value for the existing shareholders. Essentially when equity is raised the issue value of the equity will differ from the current value of the equity, managers inside information 'creates a side bet between old and new stockholders' (Myers, 1984).

This highlights the importance of the conversion premium set on a convertible issue. The benefit of the conversion premium is that it essentially retains a portion of the value of growth opportunities for the existing shareholders. The conversion premium set needs to reflect the trade-off between obtaining as much value as possible for existing shareholders, while offering enough value to prospective investors to entice them to take up the offer.

3.2.5) CHARACTERISTICS OF CONVERTIBLE ISSUERS

Essig (1991)³⁰ found that convertible use was negatively correlated to the tangible assets ratio and positively correlated to the market value ratio. Both these relationships appear to indicate the same findings for intangibles; where the tangible asset ratio is low, the costs of financial distress are high (less security to lenders in the form of collateral) and where the market value ratio is high, it implies more growth opportunities, and therefore the greater use of convertible securities.

Essig also found that firms with high debt to equity ratios are more likely to use convertible debt, and the extent of convertible use is also positively linked with volatility of the firm's operating cashflows.

3.2.6) ACCOUNTING TREATMENT OF CONVERTIBLE BONDS

IAS 32 of the International Financial Reporting Standards stipulates that the issuer of a financial instrument must evaluate the terms of the agreement to determine whether its substance represents a financial liability or an equity component, irrespective of how the agreement has been

³⁰ Essig, Stuart (1991) *Convertible Securities and Capital Structure Determinants*, Ph.D dissertation (Graduate School of Business, University of Chicago. Chicago, IL.

labelled for legal purposes. Such components are required to be recognised separately as financial liabilities, financial assets or equity instruments in accordance with the definitions set out in the International Accounting Standards.

IFRS maintains strict requirements regarding when it is appropriate for an issuer of a financial instrument to recognise the instrument as equity and when the instrument must be recognised as a financial liability.

The requirements for recognising instruments as equity are relatively technical and onerous, for the purposes of this discussion it is only necessary to consider the underlying principle set out by IFRS; a financial liability is only recognised when the financial instrument contains a contractual obligation to be settled in cash or another financial asset.

In the case of issuing a convertible bond, the instrument represents two components, a financial liability (representing the firm's contractual obligation to settle the bond and make coupon payments) and an equity component (representing the holder's option to convert the instrument into a fixed number of the issuer's equity).

Importantly it is prescribed in paragraph 30 of IAS 32 that the classification of the liability and equity components of a convertible instrument are not revised as a result of the change in likelihood that the conversion option will be exercised. While it may be apparent that exercising the conversion option would be economically advantageous to the holder, the accounting principle requires that for as long as the issuing firm has a contractual obligation to make the agreed payments, the commitment must be recognised as a liability. Once the holder elects to exercise the option or the issuer declares its intention to recall the issue, the liability is then reclassified as equity.

The implication of this accounting standard is that firms issuing convertible debt still take a financial liability on to their balance sheet, even if their intention is to raise "delayed equity". As discussed the benefits of issuing convertible debt largely revolve around firms with high growth prospects but little debt capacity. Convertible debt is an attractive option to firms with no debt alternatives where a convertible would effectively results in issuing delayed equity at a premium, however as a substantial portion of the convertible debt is recognised as a liability on the balance sheet up until the date conversion, the firm undergoes similar costs of financial distress that would have been incurred had the firm issued straight debt.

The benefits of convertibles however are still apparent. As the equity option assists to reduce the coupon rate, the value of the debt portion recognised for accounting purposes is reduced, while simultaneously reducing the cash burden on the firm. Additionally, firms looking to expand their debt capacity through issuing equity can do so using convertible debt and retain significant value for existing shareholders, by issuing the equity at a premium.

3.2.7) CORPORATE TAX TREATMENT OF CONVERTIBLE BONDS

The distinction between the debt and equity components has important implications for the tax treatment of convertible bonds. While debt and equity have traditionally been the favoured sources of finance, South African firms are showing a growing interest in the use of hybrid instruments to

exploit the tax benefits³¹. In terms of the South African Income Tax Act, coupon payments paid on straight bonds are deductible for the purposes of determining the issuing firm's income tax liability (provided the funds raised are employed in activities that further the production of taxable income).

As per the accounting treatment, a convertible bond is in essence a contractual commitment to pay fixed coupon payments, before the repayment of the principle amount or conversion. Until such time as the convertible has converted the instrument is effectively debt.

This provides a major tax advantage for the use of convertible bonds over ordinary shares. In theory there should be no tax advantage to the investor, any coupon received (that was deducted by the issuer for corporate tax purposes) will be taxable income in the hands of the investor. The advantage that exists in the market is that individuals are subject to different marginal tax rates. The highest tax bracket for individuals is currently at 43%, at this tax rate there is no benefit from the use of tax deductible coupons to the investor as he is taxed at a greater rate than the rate at which the company saves³¹. However life assurers and pension funds have a marginal tax rate of zero percent on their interest income from fund assets. This means that while the issuing firm can benefit from a 28% corporate tax deduction, the institutional investors are not necessarily required to pay income tax on the interest income, creating disparity and value.

Up until 2004, standard tax practice in South Africa was to treat convertible bonds in line with the apparent form of the agreement (as tax deductible debt instruments). However in 2004 the minister of finance announced that hybrid instruments would be treated for tax purposes based on the economic substance of the agreement. This in many ways results in the tax treatment becoming more in line with the accounting treatment. (Webber Wentzel, 2004)³²

This treatment appears to move the South African tax treatment to be more inline with the US practice (although it has yet to be seen) as discussed by Emmerich³³ one of the US approaches is that debt treatment should only classified as such for tax purposes when there is 'written and unconditional promises to pay a sum (or sums) certain in money on demand or on a specified date'.

While the tax treatment of convertibles continues to contain a grey area over the distinction between what is debt and what is equity, the principle of the tax treatment is to remove the value of the equity option from the instrument, and allow a tax deduction (inclusion) of the effective interest rate that returns the present value of the debt component to the principle value over the life of the bond. However should the conversion option be exercised before the maturity date, the effective interest rate would result in the incorrect value of deductions (or inclusions) over the shortened life of the instrument; pragmatically, the South African Revenue Service is unlikely to allow a deduction greater than the actual coupon rate paid for this exact reason³⁴. For the purposes of discussing the

³¹ However individuals receive a tax exemption for the first R22,800 earned on local interest income. Therefore individuals would also benefit from the deductibility of the coupon payments, provided their total interest income does not exceed the exemption allowed.

³² Webber Wentzel: Archived Articles (30 November 2004). See:

<http://www.webberwentzel.com/wwwb/content/en/page1874?oid=1940&sn=Detail&pid=1874>

³³ Adam O Emmerich 'Hybrid Instruments and the Debt-Equity Distinction in Corporate Taxation' (1985) University of Chicago Law Review 118.

³⁴ IFRS in Practice: Accounting for Convertible Notes.

www.bdointernational.com/Services/Audit/IFRS/IFRS%20in%20Practice/Documents/IFRS%20in%20Practice%20-%20Accounting%20fo%20Convertible%20notes%20print.pdf

tax benefits of convertibles in the rest of this paper it is assumed that the tax deduction allowed is limited to the actual coupon paid, further that all proceeds from a convertible debt issue are employed in the production of taxable income and that the issuer is always in a position to utilise any tax benefit (i.e. All coupon payments are tax deductible).

The tax and the accounting treatments could explain findings that firms are reluctant to recall convertibles until the conversion value exceeds the conversion price by some 30 to 40 percent. While the agreement is deep in the money, the firm is not required to reclassify the liability as equity until they officially announce their intention to recall. Reclassifying the debt as equity would have implications for the capital structure, earnings per share and overall company value and would result in conceding any tax benefits.

3.2.8) TERMS AND CONDITIONS: SHOPRITE'S CONVERTIBLE ISSUE

Shoprite Investments (Pty) Ltd announced the issue of R4.7 billion in convertible bonds, set to be issued from the beginning of April.

The bonds were issued and payable by Shoprite Investments, the instruments are convertible into the ordinary share capital of the parent company, Shoprite Holdings Ltd.

The specific details of the issue are summarised below:

Value:	R 4,700,000,000
Denomination:	R 1,000,000 each
Traded in Denominations:	R 10,000
Coupon Rate:	6.5%
Interest Payment:	Semi-Annually
Fixed/Variable Rate	FIXED
Liquidation Rank:	Senior, Unsecured, Guaranteed
Issue Date:	02 April 2012
Maturity:	03 April 2017
Duration:	5 years
Initial Conversion Price:	R 168.94
Share Price on Equity Issue:	R 127.50
Respective Conversion Premium:	32.50%
Average Share Price at Announcement Date:	R 135.26
Respective Conversion Premium:	24.90%
Conversion number of Shares per bond:	5,919 Shares
Conversion Ratio:	59.1926
Early Conversion at Option of Holder:	14 May 2012
Early Conversion at Option of Issuer:	03 April 2015
Convertible into:	Ordinary Shares of Shoprite Holdings Ltd
Parent Guarantor:	Shoprite Holdings Ltd
Subsidiary Guarantor:	Shoprite Checkers (Pty) Ltd
Credit Rating:	Unrated

Terms and Conditions:

A summary of the terms and conditions of the issue are presented below. The terms that were determined to have particular effect on the value of the issue, or the reasons for constructing a convertible issue were included.

1) ***Convertible at the Option of the Holder***

The holder of the options has the right to request conversion of the bonds from any date after the 14 May 2012.

2) ***Early Conversion at the Option of the Issuer:***

Bonds may be recalled by the issuer only when the stated recall protection criteria have been met. Should the issuer announce an early recall, the holder will have the option to elect either the conversion option, or the principle amount in cash. The issuer is not permitted to make partial recalls, the issuers recall must be for 100% of the convertible bonds outstanding.

3) ***Recall Protection:***

The issuers recall is only permissible once the following three conditions have been met:

- i) The issuer may only recall the convertible issue at any time on or after the 23 April 2015.
- ii) The issuer may only recall the issue if the volume weighted average price (VWAP) exceeds the conversion price by 130%
- iii) The VWAP must have exceeded the conversion value by 130% in 20 out of the 30 most recent, consecutive trading days.

4) ***Redemption:***

All outstanding convertible bonds will be redeemed on the 03 April 2017. The issuer reserves the right to elect a *soft redemption* of the convertible issue. Soft Redemption allows the issuer to settle the outstanding principle owed at maturity of the bonds in shares, despite the value of the shares amounting to less than the principle amount owed. In terms of this option the issuer must settle the difference between the consideration of the shares and the principle amount owed in cash. Where this option has been elected, the value of the share consideration received is deemed to be the number of shares issued multiplied by the VWAP for the most recent, consecutive 15 trading days.

5) ***Conversion Price Adjustments:***

The base conversion price is set at R168.94. This results in a initial conversion ratio of 5,919 shares per bond. However the conversion price is subject to certain permissible changes which would result in changes to the conversion ratio.

To ensure that the conversion price and the current share price are comparable at the time of conversion, the conversion price will be adjusted to reflect the relative conversion price in the following instances:

- i) Any alteration made to the nominal value of the Ordinary Share capital, including: share splits, share consolidations or subdivision.
- ii) Any rights issue, bonus issue or capitalisation issue of Shoprites ordinary shares.
- iii) Any extra ordinary dividends declared. The legal agreement contains a dividend

protection clause specifically stating that any cash dividend that exceeds the set thresholds will result in the adjusting down of the conversion price.

iv) Any capital distributions

v) Any discounted issue of ordinary shares, where the issue is made at 95% or less of the current market value.

vi) Any issue of securities with conversion features, where conversion would result in the issue of ordinary share capital for less than 95% of its market value.

6) **Bonds listed:**

Bonds will be listed on the JSE as of the 28 May 2012 and are available to be publically traded. The Bonds will not be rated by a credit rating agency.

7) **Notice of Default:**

No conversion rights may be exercised after notice of default is announced, or change of control.

3.2.9) DEBT/EQUITY PAYOFFS AND THE VALUE OF CONVERTIBLES:

Using convertible finance will never be a company's most optimal source of raising finance. As with any option the optimal payoff is derived from being fully invested in the best performing outcome, in the case of raising finance either a full debt issue or a full equity issue will result in being the cheapest form of raising finance.

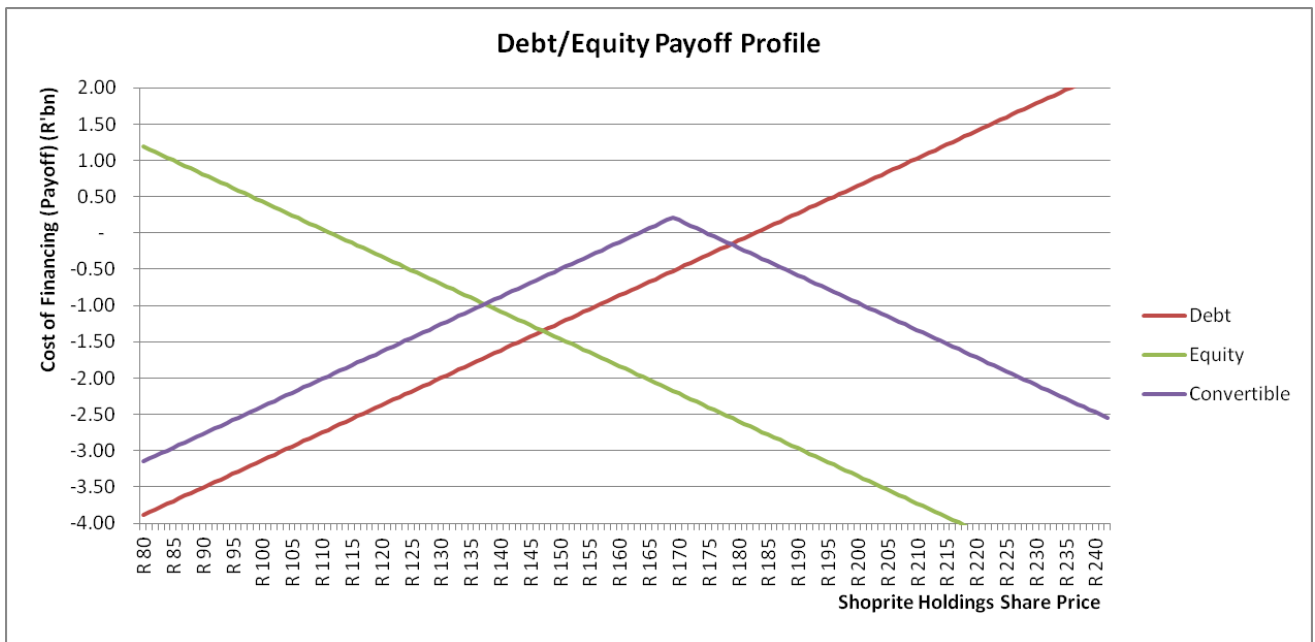
The benefit of using convertibles is traditionally thought to be value of the hedge created, thereby limiting the risk of selecting the less profitable source of finance.

Simplistically speaking, at the end of the life of the convertible, the share price as at the maturity date will indicate whether issuing equity or debt would have been more beneficial to the firm. If the share price on the maturity date closes below the theoretical value that shares could have been issued for at the time of issuing the convertible, then equity would have been the optimal source of finance for the firm as they would have raised more equity for less shares than it could have on maturity. If the share price on the date of maturity closes above the theoretical issue price, then the firm should have issued debt, as it could have issued equity at the maturity date for a greater value, and used the equity raised to repay the debt.

This is overly simplified. The issuing of equity attaches the cost of dividends which is typically far cheaper than paying interest on debt. Therefore the share price would have to close above the theoretical issue price by an amount greater than the saving the company received by paying dividends instead of interest.

Convertibles share some characteristics of both. At the maturity date, if the share price is below the conversion value, the instrument does not convert and the cost of financing to the firm is a significantly discounted cost of debt. If the share price closes above the conversion value, conversion takes place and the firm has effectively issued equity at a 30% premium to the original share value.

The payoff for any of the three financing options is directly related to the future share price. The expected cost of the three options are represented in a graph below as they appeared to Shoprite when making the decision on whether to issue convertible debt.



The payoff (or cost of finance) for Shoprite is quoted per share in the above graph. The determined payoff per share was then grossed up by the number of shares that would have to be issued at the current share price of R127, in order to raise the R4.7bn capital required by Shoprite.

To determine the expected payoff per share, the difference between the theoretical issue price and the closing share price was considered. It was assumed that Shoprite's dividend yield would continue at 2% per annum, the cost of debt raised would be 6.65% (9.24% rate per model, after tax) and the coupon rate on convertibles would be 6.5% (equating to 4.68% after tax) (per the conversion contract). The future value of the coupon, dividends and interest payments was determined over 5 years and deducted from the respective financing options payoff profile.

The graph shows that after the five year period, if the share price closed below R147.00, then equity financing would have been the optimal source of finance, if above then debt would have been more cost effective. When including convertible instruments, any share price above R137.50 but below R179.00 would result in more benefit being obtained from the use of convertibles than either debt or equity.

The graph shows that convertible instruments can hold more value to issuers than simply providing a hedge on the share price. At certain share prices the convertible yields more value than either debt or equity. Additionally, at share values below R137 and above R179, the cost of financing a convertible is less than being fully invested in the more costly option, showing the traditional value of the hedge.

Additional consideration should be given to the debt payoff. While the debt payoff represents the most value to a firm that is bullish about its own stock price, the cost of debt in this graph does not reflect the impact of a downgrade in credit rating. The use of debt may not be a feasible option to

Shoprite as the increase in the debt could cause the costs of bankruptcy to increase, causing higher costs of debt, less availability of debt and could potentially reduce their bargaining power with trade creditors, an integral aspect of any retailers operations. In the later discussion of the Altman EM Score results it can be seen that Shoprite's debt capacity was limited to approximately R1.4bn. This shows that while debt may have been expected to be the most cost effective source of finance, the option was not available, as there was no market for debt in the quantities required by Shoprite (at a market rate of 9.74%).

On the assumption that debt is not available to the extent of Shoprite's financing requirements, then based on the options of straight equity versus convertible debt, the breakeven share price for when Shoprite would be indifferent between these two options is R137.50. This represents a share price premium 8.27% over five years, which translates to a required compound growth rate of just 1.6% per annum. In summary, if Shoprite's management believe they can achieve a growth rate of only 1.6% or greater then they will derive more value from issuing convertibles than they could from straight debt. This would seem highly likely given that Shoprite's compound growth rate since 2007 has been 40.5%.

Similarly from a debt perspective, with a break even share price of R179.00, the share price would have to grow by a compound growth rate of more than 7.1% for straight debt to hold more value than convertible bonds. This could indicate uncertainty from Shoprite's management. If debt is considered to be a viable option, then Shoprite's decision to issue convertibles would suggest that management are uncertain as to whether the firm can achieve the required 7.1% compound growth rate, the local economy at the time of the issue was forecasting 3% GDP growth rate (revised to 1.2% nine months later), while the firms plans to expand into Africa would only provide growth of 5% based on economic forecasts of GDP growth, short of the required 7.1%.

3.3) VALUING CONVERTIBLE DEBT INSTRUMENTS

Convertibles were first valued using a single equation model in the early research of Ingersoll (1977)³⁵ and Brennan and Schwartz (1977)³⁶. Convertibles are the combination of two separate instruments, a straight bond and a warrant. The issue with valuing convertibles on a single equation model is that the model looks at the two instruments simultaneously; as a result there are many inter-dependencies on key variables. Using a two equation approach one can value the debt and the conversion feature separately, and then combine the instruments to arrive at the convertible debt value. The result is a specific trade-off between the value of the debt and the option components. Straight debt is relatively simple to value. If a company already has active corporate debt on the market, the convertible debt portion can be valued accordingly, making certain rate adjustments to account for the different risk factors such as debt subordination. The difference between the rate of the debt per the market and the rate calculated for the convertible would indicate the value of the warrant.

³⁵ Ingersoll, Jonathon (1977) *A Contingent-Claim Valuation of Convertible Securities*, Journal of Financial Economics, 4, 289-322.

³⁶ Brennan, M.J. and Schwartz, E. (1977) *Convertible Bonds: Valuation and Optimal Strategies for Call and Conversion*, Journal of Finance, 32, pp1699-1715.

Options are traditionally valued by either the binomial option pricing model or the Black-Scholes option pricing model (1973)³⁷. The issue with valuing the conversion feature using the Black-Scholes equation is that the contingent claims portion of the warrant makes use of variables that have “unavoidable interdependencies” on the variables used to value the debt portion of the convertible.

Billingsley et al. (1986)³⁸ developed a two equation model that uses the debt component as the starting point. The model values the debt as is if no warrant was attached, and then values the warrant separately. In order to assess the comparable benefits of the convertible debt used by Shoprite the model will deduct the value of the warrant from the present value of the straight debt, the effective interest rate determined would be the coupon rate payable to the market, reflecting the value of the firm’s straight debt. The difference between the effective rate and the coupon rate represents the subsidisation effect that the value of the option has on the cost of the debt.

Valuing the Straight Debt

The method for valuing the straight debt portion of the convertible is based on determining a credit spread on the risk free rate. In the model developed by Billingsley et al. the 20 year U.S. treasury yield was used as the starting risk free rate. One of the issues with using this long risk free rate is that it may not necessary match the maturity of the bond. Typically convertible issues would not have a maturity period of longer than 15 years. More practically, Asquith’s³⁹ research into the promptness of companies recalling bonds shows that companies tend to recall convertible as soon as it is feasible to do so (by feasible Asquith means that the conversion value exceeds the call price, the call protection period has expired and common stock dividends are less than the after-tax coupon payment on convertibles). Asquith documented that firms had a median length of less than a year (252 days) and that 21% of convertible issues did not contain any protection clause at all. Further, once the conversion value exceeded 120% of the call value, the median delay before announcing the recall was only 18 days. Billingsley and Smith (1996) showed that the mean conversion premium for their sample of firms issuing convertible debt was 19.81% (premium on the current stock price). Based on these average values were can very roughly approximate the following table:

Current Stock Value	Conversion Premium on Issue	Conversion value premium on call value
R 100.00	19.81%	20%
R 100.00	R 119.81	R 143.77
Stock Gain		R 43.77
CAGR*:		
1 year		43.77%
2 years		19.90%
3 years		12.86%
4 years		9.50%
5 years		7.53%
6 years		6.24%
7 years		5.32%

*Compound Average Growth Rate

³⁷ Black, F. and Scholes, M. (1973) *The Pricing of Options and Corporate Liabilities*, Journal of Political Economy, pp637-654

³⁸ Billingsley, R.S., Lamy, R.E. and Thompson, R.G. (1986) *Valuation of Primary Issue Convertible Bonds*, Journal of Financial Research, vol IX, No3.

³⁹ Asquith, Paul. (1991) *Convertible Debt: A Dynamic Test of Call Policy*, Working Paper (Sloan School of Management, MIT, Cambridge, MA)

If the firm either insisted to only force conversion at a 20% premium (either as part of the call protection or due to conservative management worried about triggering debt burdens) the average call value would be R143.77, a stock gain of R43.77. Determining the annual compound growth rate required to achieve this stock gain shows that the company would only have to display a growth rate of 7.53% to reach this value in 5 years. Therefore while the maturity of the convertible bond may be agreed to be over a 15 or 20 year period, the reality is that it is unlike for the conversion issue to be in existence for more than 7 years. This is especially true on the back of Stein's research showing that companies that issue convertible debt only do so if they are confident in that their private information will result in strong future share performance and management can force conversion.

As described by Stein, companies issuing convertibles cannot afford to issue debt, as a result, they would not issue convertibles unless highly confident that the bond will convert. This is not to say that all convertible issues result in conversion, management may fail to convert growth opportunities into economic value but by in large convertible use is positively correlated with firms that have exhausted debt options and have large information asymmetries. Based on this it is not hard to believe that given management are optimistic enough on the value of their private information to be willing to issue convertible finance, the firms compound average growth rate will likely be exemplary, or at least above mediocre. This would indicate that most convertible issues are unlikely to be in issue for longer than 5 to 6 years.

For the purposes of this model a 5 year risk free rate is used as this is aligned with the specific terms of the Shoprite convertible issue.

In order to determine the spread on the risk free rate, Billingsley et al (1986) found that the following four independent variables have significant influence:

1. Credit Rating. This factor looks at what the strength of the firm's investment rating is per a recognised rating agency. For consistency, Billingsley et al elected to use Moody's Investment Service rating. The lower the rating, the larger the costs of financial distress and therefore the more risky the debt, leading to a larger spread on the risk free rate.

Shoprite does not have a published credit rating, therefore for the purposes of deriving Shoprite's spread on the risk free rate, the credit rating is derived using Altman's emerging markets score (EMS) model. Based on the crediting rating as per this model, a range of credit spreads can be inferred based on current corporate bonds trading with similar ratings.

2. Interest Rate Volatility. The interest rate volatility at the time of the issue indicates the level of market uncertainty. Billingsley et al measured this as the volatility in the market yield of 20 year government bonds over the previous 10 days (from issue) as a mean absolute variation from the 20 year risk free rate. This variable is essentially capturing the level of uncertainty that surrounds the interest rate at the time of issue. The value of this measure is to understand the volatility surrounding the base yield selected as the risk free rate. It is necessary to identify whether the base rate used on the date of issue is subject to high volatility (i.e. is likely to change often and by how much) as the coupon rate is fixed and so fluctuations in the risk free rate will affect the price of the bond. The empirical evidence of

Billingsley (1985)⁴⁰ and Kidwell et al (1984)⁴¹ has shown that the greater the market uncertainty (higher volatility), the larger the related yield spreads.

3. Size. The size (monetary value) of the issue is will affect the riskiness of the bond as the larger the rand value of an issue, the greater its marketability (improving liquidity) and therefore the lower the investment risk. Billingsley et al modelled the relationship of the size of the issue as a log distribution. The reason for this is that while the marketability benefits increase as the size of the issue increases, there will be a point where these benefits will cease to increase, or increase at a decreasing rate.

Shoprite's convertible issue will be listed and freely traded on the JSE. This improves the liquidity of the bond. Restrictions on the convertible prevent it from being acquired by U.S. persons (legal or natural) as such the market for the convertible is slightly smaller however this effect is considered too marginal to be incorporated into the model. Additionally the bonds, denominated at R1 million each, can be traded in sub units of R10,000 again improving its liquidity.

4. Call protection period on the issue. This factor takes into account the length of the protection period against the call provision, where the minimum length would be no call protection, and the maximum being full protection until maturity date. The shorter the period, (i.e. the less call protection offered) the higher the credit spread will be to compensate investors for the increased risk of less call protection.

Shoprite's call protection will last a minimum of 3 years. The call protection includes additional requirements that the share price exceeds 30% of the conversion price for 20 out of 30 consecutive trading days. Both these clauses will reduce the credit spread on the bond as the investment risk is reduced to the investor.

A further protective clause for the benefit of the investor is that the bond holder may request conversion of the bond at any time during the life of the bond. This feature is effectively a put option on the bond. The further protection again lowers the credit spread.

The results of this model when used by Brennan and Schwartz (1980)⁴² yielded a six basis points premium on the risk free rate. This result would indicate that the bond component of the convertible is essentially risk free. This result is unlikely to occur in present South African markets as all companies contain inherent default risk and as indicated by Stein, if the bond fails to convert, there are likely to be significant cash strains on the company. The bond component of a convertible is seemingly not free from default risk. In contrast Billingsley et al (1986) results showed the average debt premium to be 333 basis points above the risk free rate. Based on research as to the type of

⁴⁰ Billingsley, R.S., Lamy, R.E, Marr, M.W. and Thompson, G.R. (1985) Split Ratings and Bond Reoffering Yields. *Financial Management*. 14. Pp59-65.

⁴¹ Kidwell, D.S., Marr, M.W. and Thompson, G.R. (1984) *SEC Rule 415: The Ultimate Competitive Bid*. *Journal of Financial and Quantitative Analysis*, 19. Pp183-195.

⁴² Brennan, M.J. and Schwartz, E. (1980) *Analyzing Convertible Bonds*, *Journal of Financial and Quantitative Analysis*.15.pp907-929

companies issuing convertible debt and the credit ratings that these companies have, a 3.33% credit spread appears to present a more appropriate result.

Billingsley and Smith's (1996) survey shows that management's primary motive for issuing convertibles is moving toward buying down the coupon rate. This supports the finding that the average debt spread would be in the region of 3.33% above the risk free rate. Research by King (1984)⁴³ revealed that the value of straight debt to represents approximately 82% of the value of the convertible.

3.4) CONVERTIBLE DEBT IN THE SOUTH AFRICAN MARKET

As noted in the beginning of this paper convertible debt, while convertible debt is showing signs of becoming a growing trend in South Africa, it has not traditionally been popular choice of finance in comparison to the U.S. and European markets. Some consideration to this is given below as it pertains to the Shoprite convertible issue.

When using external funding straight debt it is the preferred source of finance. Only companies that cannot afford to issue debt, would consider to issue convertibles to save value over issuing straight equity. Rajan and Zingales (1995)⁴⁴ found that between 1987 and 1991 (approximately the same period that convertibles were extremely popular in the US and not in the UK) companies of the UK and Germany were particularly less levered than companies in the US. During this period US companies external financing consisted almost entirely of debt, while UK companies maintained 'extremely low leverage' (Laurent, 2006)⁴⁵. Rajan and Zingales conclude from these findings that that the differences in leverage between the two countries was not random, but a conscious financing choice.

Rajan and Zingales first explanation is that the differences in the tax laws between the US and the UK result in different effective tax rate for both corporate and individuals. Ashton (1989)⁴⁶ furthers this reasoning by indicating that the UK (like South Africa) has no double taxation on dividends, which US companies have, reducing the comparative benefit of debt over equity in UK markets.

Secondly, is the issue of government legislation protecting creditors. In the US, legislation governing *chapter 11: bankruptcy* is structured to incentivise stakeholders to attempt to revive the company rather than to liquidate it by giving creditors less rights on liquidation. The UK by contrast has a strong emphasis on protecting creditors by allowing creditors to file for insolvency at a much earlier stage in the liquidation process, potentially leading to premature liquidations.

As a result the bankruptcy costs, or costs of financial distress, associated with companies are much higher in the UK than compared to the US for the same level of leverage, as the probability of a

⁴³ King, R.D. (1984) *The Effect of Convertible Bond Equity Values on Dilution and Leverage*, The Accounting Review, 59, pp419-431.

⁴⁴ Rajan, R.G. and Zingales, L. (1995) *What Do We Know About Capital Structure? Some Evidence from International Data*. Journal of Finance, vol: L, No5.

⁴⁵ Laurent, S. (2006) *Convertible Debt and Preference Share Financing: An Empirical Study*. University of West England.

⁴⁶ Ashton, D.J. (1989) *Textbook Formulae and UK Taxation: Modigliani and Miller Revisited*, Accounting and Business Research. 19. 207-212

creditor perusing its debt with legal action is much higher. Management are then obviously far more inclined to avoid debt under these circumstances.

Traditionally, South African company law has been more closely related to UK law. The South African Companies Act of 1973 contained more favour for creditors rights allowing them to apply to have their debtors declared insolvent, and further more directors of companies could be sued for civil and criminal penalties if found to have been 'recklessly trading' (trading whilst company insolvent).

This has made the use of debt in South Africa less favourable as the associated costs to both the company and management are too high.

In 2009 the revised Companies Act of 2008, was passed by parliament. This included the new Business Rescue provision which became enforceable in late 2010. The new statute introduces a new regime for rescuing companies, which is largely based on the Chapter 11: US Bankruptcy Code (Monique Verduyn)⁴⁷.

The statute places emphasis on reorganisation rather than the liquidation of companies, recognising that businesses may be worth more value if reorganised than if sold for the sum of its parts. The act also promotes business rescue proceedings by reducing the criminal sanctions that could be brought against directors and replacing them with administrative and civil remedies.

The most important feature of the new business rescue proceedings to South African companies is that bankruptcy costs are reduced. Companies in financial distress can resort to business rescue, to potentially avoid liquidation. While the company is under business rescue all legal proceedings are suspended, including creditors seeking retribution.

"Once a company is in business rescue, there is a moratorium on most legal proceedings against the company. Thus suretyships or guarantees cannot be enforced against the company, having major implications for funding institutions." (Haydn Davies⁴⁸)

UK Banks also maintain more power over lending. Banks offer private financing more readily than offering to underwrite public issues. This allows the banks to closely monitor and control the debt outstanding, but becomes a hindrance to companies. As a result, companies have preferred equity finance, making equity the dominant source of finance in the UK. The result of this is that the UK has relatively underdeveloped bond markets, due to the lack of underwriting support received from banks.

Whether South African banks operate in a similar manner remains an area to be investigated however it is conceivable that a similar situation is occurring in South Africa where the corporate bond market is relatively underdeveloped.

Similarly on the point of convertibles, the market for options and warrants in South Africa is very immature at this stage. The combination of both these factors may play a role on the market's ability to facilitate convertible issues.

⁴⁷ <http://www.entrepreneurmag.co.za/advice/doing-business-in-sa/compliance/new-companies-act-and-business-rescue/>

⁴⁸ Haydn Davies (Partner) Webber Wentzel. See: <http://www.engineeringnews.co.za/article/business-rescue-proceedings-in-the-new-companies-act-of-2008-have-far-reaching-consequences-warns-law-firm-2010-04-02>

4) VALUING ALTERNATIVE SOURCES OF FINANCE:

4.1) DETERMINING SHOPRITE'S CORPORATE BOND YIELD:

To determine Shoprite's corporate bond yield, we need to first determine an appropriate risk free rate, and then quantify a risk premium specific to the convertible bond issue.

Market yields for different bonds vary based on a variety of factors that essentially effect the risk of the investment. The paper considers government or treasury bonds to represent a risk free interest rate (free from default) for the purposes of modelling the debt.

In order to identify the appropriate risk free rate, it is necessary to select the government bond which best represents the same terms as the corporate bond being considered. The appropriate risk free rate needs to be comparable within the following categories to appropriately represent the base rate:

1. Term Structure
2. Coupon Rate Effect and Duration
3. Option Adjusted Spreads
4. Default Risk and Liquidity

Term Structure

Term structure relates to the relationship between the yield and the maturity of securities that differ only in the length of time to maturity (i.e. coupon rates and all other factors held constant.)

To isolate the effect of term structure we must compare bonds with identical default risk (to hold all variables constant to focus only on differing maturities) which is only possible when comparing treasury bonds. Term structure shows that yields for identical bonds increase at a decreasing rate, as the maturity of the bond increases. What this means is that bonds with identical coupon payments and identical risk profiles, will have different yields depending on the maturity period of the bond.

In the selection of the appropriate risk free rate, the government bonds must have maturities of 5 years to be comparable to the Shoprite convertible issue, as this represents the same maturity as with the convertible issue. Any bonds considered with longer maturities would need to have their yields adjust downwards to account for the yield curve effect. While early conversion could feature, the convertible has a three year protection clause, the difference in the yields of potentially a 2 year gap in the maturity would not be more than 30 to 50 basis points (Bloomberg). In determining the range of the risk free rate, three and four year maturity government bonds will be considered in approximating the yield, however the biggest weighting would be towards a five year maturity.

The full maturity of the convertible is used in determining the risk free rate as the probability of the conversion is valued in the option component of the convertible. From a straight debt perspective we need to value what the bond element is worth independently from the conversion feature and secondly there will be an option risk adjustment made to the credit spread to factor in the issuers right to make an early call on the bond. Both of these factors would result in double counting if we

were to price them into the risk free rate and then additionally adjust for them in the risk premium determined in the model.

The Coupon Effect

The coupon effect is driven by the amount of return that the investor is to receive in the principle repayment on maturity; the greater the amount of repayment that is still at risk throughout the life of the bond, the more exposed the investor is to price fluctuations in the bond.

Lower coupon bonds have bigger changes in price for changes in interest rates as more of the return is exposed to interest rate risk (being received in the principle), making lower coupon bonds more volatile, and therefore higher risk to investors. This means that for lower coupon bonds the relative market yield will increase.

This raises the concept in bond pricing known as duration. Analysis of the maturity of bonds does not necessarily measure the time (and the value) that cashflows are at risk. Duration is the weighted average measure that coupon and principle payments will be received.

Duration weights the cashflows based on when they are received and derives an effective time value that the return is at risk for. The shorter the effective duration, the lower risk the bond. This essentially accounts for receiving coupons earlier as better than receiving them later. A zero coupon bond will have a duration equal to its maturity, as there is no early receipt of any of the return.

Duration and market yields are positively related, the longer capital is at risk, the greater the return required by the investor.

In terms of determining the risk free rate, the coupon needs to be of comparable size. While the five year government bond is representative of maturity, its coupon is 175 basis points above the coupon of the convertible bond. Given that the coupon is so significantly lower, we would expect a higher yield to represent the investor's capital being exposed for longer. We would therefore expect the risk free rate to range between 724 and 783 basis points.

Mat.	Bond	% Yield
3Y	SAGB 8.75 12/21/14 Corp	5.985
4Y	SAGB 13.5 09/15/15 Corp	6.665
5Y	SAGB 8.25 09/15/17 Corp	7.244
9Y	SAGB 6.75 03/31/21 Corp	7.828

(Source: Bloomberg)

The most prevalent factor that effects market yields is the maturity of the bond. For this reason the five year yield of 724 basis points is thought to be the most appropriate risk free rate for the model. While the early conversion feature would suggest that the yield could range below this yield, the duration effect would be expected to slightly increase the market yield. The early conversion feature and the duration effect would have only a marginal impact on the market yields, and as they move in opposite directions, the two effects largely net off against each other. As a result we will set the risk free rate for the model at 724 basis points.

Option-adjusted Spreads:

With fixed income securities, there are typically certain legal clauses written into the contract that allow either the issuer or the borrower the 'option to take action'⁴⁹. These are usually protective clauses looking to control the risk for either the issuer or the borrower. Examples of these clauses would be debt covenants, increasing required value of collateral, call options.

As the nature of the options are protective, when these clauses are included they typically reduce the risk for the party (issuer/borrower) it favours, reducing the required return, and increases the risk for the party it is not in favour of, increasing their required return. For example, the provision of loan covenants reduces the risk to the investor, thus he would be willing to settle on a lower return. The acceptance of this term is unfavourable to the borrower, but he will be able to secure a lower cost of finance.

With regards to the convertible issues, the major protection comes in the form of call and put options. The Shoprite convertible issue contains a call provision that allows the issuer to recall the debt at any time after the three year protection period, and provided that the shares exceed the early recall price. The early recall provision protects the issuer in the event that the conversion price is largely exceeded and the bonds will almost certainly convert, the issuer is able to force conversion and stop paying coupon payments that are generally more than double dividend yields on securities that are effectively equity. As this protects Shoprite, they should in turn be willing to settle at a higher cost of debt. This upward adjustment to the credit spread is partially offset by the bond holders call protection clauses. The bond holder also contains a put option on the bonds, exercisable at any time.

Specific to the Shoprite issue, the terms of the convertible allow Shoprite to elect to settle the principle using the 'soft redemption' method. This allows Shoprite to redeem the bonds using equity even if the conversion price is not reached. In this situation Shoprite would payout the difference in value to the bondholder in cash. This option is particularly valuable to Shoprite. While the value to the investor is not materially affected, the option significantly reduces the risk of cash strain that would be experienced if the bonds did not convert. This again would increase the yield spread to compensate investors for the flexibility afforded to Shoprite.

Cyclical Behaviour of Risk Premiums:

Risk premiums show a trend of being cyclical in nature. Studies⁴⁹ show that during the period of 1946 to 1999, the yield differentials between AAA and BBB rated securities was substantially higher during recessions than in periods of economic expansion.

The two major reasons attributed to this are liquidity and uncertainty. During economic contractions the probability of default increases for all companies as cashflow becomes constrained. The likelihood of default in lower rated companies is far greater than that of higher rated companies. As such the demand for higher quality bonds makes them more liquid (flight to quality). The lower quality bonds suffer a large discount in price as there is surplus supply and no demand, the decrease in price relates to an increase in yield. When compared to the relatively unaffected higher quality bonds, the yield differential widens significantly.

⁴⁹ Van Horne, James C. (2001) *Financial Market Rates and Flows*. 6th Edition. Stanford University, New Jersey. pg 131

During periods of economic expansion, the default probability of lower quality bonds is largely reduced, and investors are more inclined to buy these bonds, increasing demand, restoring liquidity to the lower quality bonds, strengthening their price and therefore narrowing the yield differential.

Default and Liquidity

Default risk is primarily indicated using credit ratings. The two primary credit rating agencies used worldwide are Moody's Investor Services and Standard & Poor's. These agencies use a host of corporate failure prediction models to gain insights into the probability of default and rate each company based on these results. The models used generally rely on the core theory of either the contingent claims approach using option based theory, or accounting ratio analysis which is based largely on Altman's Z-score model to predict default probability, or a hybrid of the two.

Credit rating agencies have invested vast amounts of money into researching and collecting private data and tweaking models to generate more accurate results, while these improvements do improve the agencies accuracy of prediction, the largest component of these ratings can still be derived from core theory. Altman's models for predicting credit ratings have proven to be impressively accurate.

As a proxy for determining Shoprite's credit rating, as they are not currently rated by a rating agency, the model will rely on Altman's EMS model.

The importance of determining Shoprite's credit rating relates not only to its yield but also in determining what the company's debt capacity is.

The emphasis placed on debt capacity is important. Management are inclined to prefer debt financing, but only up to the extent that the company can maintain its credit rating. In fact, studies show that companies are least likely to issue debt when approaching a credit rating status change.⁵⁰ Kisgen's findings show that companies on the verge of being upgraded will not issue debt to achieve a stronger debt rating, and companies on the verge of being downgraded are even less inclined to issue debt. These effects were apparent, but less distinct than the financing choices were made within companies that were approaching 'investment grade' status. Credit ratings have a huge effect on companies. Credit ratings dictate the rate at which finance is provided and how much funding is made available to the firm (investment mandates prevent investors from lending to firms below a certain investment grade). A change in the credit rating could trigger onerous loan covenants as severe as requiring that the entire loan amount is repaid immediately or requiring additional collateral or some other provision, all as a result of being associated with a riskier investment grade.

Quantifying the cost-benefits of moving into or out of a certain investment grade for the purposes of this paper would be overly complex, as a result we will assume any company that stands to benefit from the use of convertible debt, would only issue debt to the extent that it could maintain its investment grade status.

Convertible bonds are equally exposed to default risk. The option to convert is worth no more than equity if the company goes into liquidation. The compensation for investors taking on this risk is exposure to the upside of the equity option however the convertible bond holders are effectively more exposed to default than straight bond holders.

⁵⁰ Kisgen, Darren J. (2007) *The Influence of Credit Ratings on Corporate Capital Structure Decisions*. Journal of Applied Corporate Finance. Vol 19. No3. Pp66-74.

4.2) DETERMINING SHOPRITE'S CREDIT RATING AND DEBT CAPACITY

In order to value the potential cost to Shoprite had they elected to raise finance through straight corporate debt it needs to be determined what yield Shoprite would pay on a corporate bond. As discussed the yield is a function of the investment risk of the company to the investor. Based on this the starting point for determining Shoprite's available cost of debt is to determine its credit rating using Altman's EM Score. Having determined a credit rating we can define a range of market yields that approximate Shoprite's cost of borrowing based on similar corporate debt available in South Africa and the additional risk factors considered above.

Additionally the market yield on the bonds is determined through the options valuation model. Once the value of the option has been determined, the value is stripped out of the bond principle so that the bond, without the conversion option is effectively issued at a discount, using the fixed coupon rate the bond's cashflows are set out and the implied market yield is determined as the IRR. The implied market yield can then be reconciled to the determined range of credit spreads.

4.2.1) ALTMAN EM SCORE MODEL

Z-score analysis was originally developed by Edward I. Altman (1968)⁵¹ as a model that uses financial ratio analysis to assess the financial state of companies, and derive a 'score'. The scores were then interpreted as an indication of the company's likelihood of going bankrupt. The history behind Altman's development of the Z-Score was that crediting rating agencies at the time had been developed to provide merchants with information regarding the credit worthiness of their potential customers. Formal studies from as early as the 1930's already began to show that failing firms show significantly different ratio measurements to continuing firms. The studies showed that accounting ratios had an important role to play in the prediction of corporate failures, one study⁵² showed clear indications of bankruptcy in the solvency ratios of companies some 5 years before bankruptcy. These studies identified that ratios measuring profitability, liquidity and solvency contained the most significant indicators, but the order of importance and the exact method to interrupt the ratios remained unknown.

The lack of consistency and formal trend analysis meant that this approach to predicting corporate failure was likely to be susceptible to faulty interpretation. Altman therefore went about extending these studies to not look at each financial ratio in isolation but to combine several measures into a meaningful model. Altman's challenge was then to determine which ratios are most important to detecting bankruptcy and what weight should these ratios have in the model.

After extensive research and analysis, Altman developed the following model, using a combination of five accounting ratios, with statistically developed weightings, known as the Z-Score model.

⁵¹ Altman, Edward I (1968) *Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy*. The Journal of Finance. Vol. 23 No.4

⁵² W. H. Beaver, "Financial Ratios as Predictors of Failure," *Empirical Research in Accounting, Selected Studies*, 1966 (Institute of Professional Accounting, January, 1967), pp. 71-111. Also a recent attempt was made to weight ratios arbitrarily, see M. Tamari, "Financial Ratios as a Means of Forecasting Bankruptcy," *Management International Review*, Vol. 4 (1966), pp. 15-21.

$$Z = 0.12 \frac{\text{Working Capital}}{\text{Total Assets}} + 0.14 \frac{\text{Retained Earnings}}{\text{Total Assets}} + 0.33 \frac{\text{EBIT}}{\text{Total Assets}} + 0.006 \frac{\text{Market Value Equity}}{\text{Book Value Debt}} + 0.999 \frac{\text{Sales}}{\text{Total Assets}}$$

The first four variables were found to be statistically significant at the 0.001 level, indicating that the variables were able to consistently discriminate between failing and continuing companies by magnifying the importance of the ratio it measured.

The results of the model using American data were relatively accurate. When predicting the likelihood of corporate failure within the next 12 months the model correctly identified the failing corporate with 95% accuracy and only misclassified a continuing company as failing 3% of the time.

The results two years prior to bankruptcy were less accurate however showed encouraging results. The model correctly predicted which companies would fail with 72% accuracy, and incorrectly classified continuing companies as failing 6% of the time.

The strength of Altman's model was based on the specifically regressed weightings derived on US data. While there is no reason why this model couldn't be applied on companies operating in other parts of the world Altman recognised that each environment had its own set of circumstances surrounding bankruptcy law and common practice. Altman's 2005 paper developed a model to specifically revise the weightings of the variables in order to make the model more accurate in an emerging market context. The revised model was known as the Emerging Market Score Model (EMS). The EMS model is designed to produce a modified rating. The rating is modified broadly based on a fundamental financial review derived from a quantitative risk model, and secondly on the assessments of specific credit risk in emerging markets (Altman, 2005)⁵³. The result of the model is intended to be assessed in conjunction with the appropriate sovereign yield.

The issue with the initial Z-Score model is that it was developed primarily to assess firms in the manufacturing industry. Altman amends his original model based on his experience in modifying models to incorporate private companies and non-manufacturers. The result is the following model:

$$\text{EM Score} = 6.56 \frac{\text{Working Capital}}{\text{Total Assets}} + 3.26 \frac{\text{Retained Earnings}}{\text{Total Assets}} + 6.72 \frac{\text{Operating Income}}{\text{Total Assets}} + 1.05 \frac{\text{Book Value Equity}}{\text{Total Liabilities}} + 3.25$$

The constant term of 3.25 was derived in the Z''-Score model, one of Altman's amended models to adjust the original model for non-manufacturing firms. The constant is used to standardise the results so that scores can be interrupted with reference to a target band.

Altman then analysed the bonds in terms of the issuing firm's vulnerability to devaluing exchange rates. The model was designed to produce results from the perspective of an American analyst, analysing foreign bonds and therefore the issuing firm's ability to service the debt in the foreign denominated currency (US dollars) is a necessary consideration. For the purposes of our analysis of Shoprite, this adaption of the model would be considered from the perspective of a South African analyst in rands. The vulnerability of the firm to service the debt in the relevant currency depends on the extend it contains a natural hedge between the amount revenue and costs generated in the same currency that the bonds are denominated in, and the level of cash on hand as compared to the amount of debt coming due within 12 months. From this consideration, if the firm has high

⁵³ An emerging market credit scoring system for corporate bonds Edward I. Altman * NYU Stern School of Business, New York, NY 10012, U.S.A Received 10 February 2005; received in revised form 2 September 2005; accepted 9 September 2005

vulnerability, the credit rating assigned to the firm would need to be dropped by one placing, such that a BB+ would become a B+.

Z"-Score				Rating		Z"-Score				Rating		
Safe zone	{		> 8.15	AAA		5.65	–	5.85	BBB-	{	Grey zone	
		7.60	–	8.15	AA+		5.25	–	5.65			BB+
		7.30	–	7.60	AA		4.95	–	5.25			BB
		7.00	–	7.30	AA-		4.75	–	4.95			BB-
		6.85	–	7.00	A+		4.50	–	4.75			B+
		6.65	–	6.85	A		4.15	–	4.50	B	{	Distress zone
		6.40	–	6.65	A-		3.75	–	4.15	B-		
		6.25	–	6.40	BBB+		3.20	–	3.75	CCC+		
		5.85	–	6.25	BBB		2.50	–	3.20	CCC		
							1.75	–	2.50	CCC-		
							< 1.75	D				

(Source: Altman, September 2005)⁵⁴

The next adjustment made relies on the results of the model and the finding from the analysis of exposure to currency devaluation. If the rating from the model results in a rating that is a full letter above or below the general rating for the industry, then the rating derived needs to be adjusted further. If the rating is within the same letter class the adjustment is one notch, if the rating is in another letter class the adjustment is two notches. (Eg: If the model rating is BBB+ but the industry rating is any B rating below BBB+, then the adjustment is one notch down from BBB+ to BBB, if the industry rating was a CCC+ then the adjustment would be from BBB+ to BBB-).

⁵⁴ Altman, Edward I (2005) *An Emerging Market Credit Scoring System for Corporate Bonds*. Emerging Markets Review. NYU Stern School of Business, NY.

Sector	Average Sector Credit Safety
Telecommunication	High A
Independent Finance	High A
Natural Gas Utilities	High A
Beverages	High A
High Quality Electric Utilities	High A
Railroads	High A
Food Processing	Mid A
Bottling	Mid A
Domestic Bank Holding	Low A
Tobacco	Low A
Medium-Quality Electric Utilities	Low A
Consumer Products Industry	Low A
High Grade Diversified Mfg./Conglomerates	Low A
Leasing	Low A
Auto Manufacturers	Low A
Chemicals	Low A
Energy	Low A
Natural Gas Pipelines	High BBB
Paper/Forest Products	Mid BBB
Retail	Mid BBB
Property & Casualty Insurance	Mid BBB
Aerospace/Defense	Mid BBB
Information/Data Technology	Mid BBB
Supermarkets	High BB
Cable and Media	High BB
Vehicle Parts	High BB
Textile/Apparel	High BB
Low-Quality Electric Utilities	Mid BB
Gaming	Mid BB
Restaurants	Mid BB
Constructions	Mid BB
Hotel/Leisure	Mid BB
Low-Quality Manufacturing	Mid BB
Airlines	Low BB
Metals	High B

Fig. 2. Average credit safety of industry groups (source: [Salomon Brothers, 1995](#)).

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Altman then makes an adjustment depending on whether the issuer is a dominant power in its industry based on size, political influence and quality of management. The adjustment for this consideration is one notch up or down or no change.

4.2.2) MODELLING SHOPRITE'S PRO-FORMA BALANCE SHEET AND EM SCORE:

In order to quantify Shoprite's available debt capacity, the model makes pro-forma adjustments to the balance sheet, increasing the level of debt and allocating the funds raised over two accounts, Long Term Investments and Inventory. The purpose of the model is to forecast Shoprite's financial

⁵⁵ Adapted from: *Six-Month Credit Quality Overview*, Salomon Brothers Inc., January 18, 1995.

statements under scenarios of increasing levels of debt, and at each level the model balances the financial statements and computes the EM score. Once the EM score reaches a level that would result in Shoprite's credit rating being downgraded, the debt capacity is considered to have been reached.

Model Results		Max Debt (No Change)	Min Debt (with Change)	Straight Debt Issue	Straight Equity Issue	Convertible Issue
Share Price		127.50	127.50	127.50	127.50	168.94
Number of Shares		506.1	506.1	506.1	506.1	506.1
Cost of Debt		9.50%	9.50%	9.50%	0.00%	6.50%
Tax Rate		28%	28%	28%	28%	28%
After Tax Cost		6.84%	6.84%	6.84%	0.00%	4.68%
Additional Debt Raised		1,400,000,000	1,600,000,000	4,700,000,000	-	2,820,000,000
Increase in Equity		-	-		4,700,000,000	1,880,000,000
Reduction in Number of Shares		-	-	-	36,862,745.10	11,128,211.20
New Share Balance		506.10	506.10	506.10	542.96	517.23
Inventory		20%	20%	20%	20%	20%
Investment		80%	80%	80%	80%	80%

Balance Sheet		Max Debt (No Change)	Min Debt (with Change)	Straight Debt Issue	Straight Equity Issue	Convertible Issue
R (Millions)						
Cash and Short Term Investments	1,961.6	1,961.6	1,961.6	1,961.6	1,961.6	1,961.6
Total Receivables, Net	2,301.6	2,301.5	2,301.5	2,301.5	2,301.5	2,301.5
Total Inventory	7,055.9	7,335.9	7,375.9	7,995.9	7,995.9	7,995.9
Other Current Assets, Total	38.5	38.5	38.5	38.5	38.5	38.5
Total Current Assets	11,357.6	11,637.5	11,677.5	12,297.5	12,297.5	12,297.5
Less: Interest paid in Cash	-	-95.76	-109.44	-321.48	-	-131.98
Property/Plant/Equipment - Net	8,168.7	8,168.7	8,168.7	8,168.7	8,168.7	8,168.7
Goodwill, Net	181.0	181.0	181.0	181.0	181.0	181.0
Intangibles, Net	538.1	538.1	538.1	538.1	538.1	538.1
Long Term Investments	59.7	1,179.7	1,339.7	3,819.7	3,819.7	3,819.7
Note Receivable - Long Term	13.6	13.6	13.6	13.6	13.6	13.6
Other Long Term Assets, Total	385.1	385.1	385.1	385.1	385.1	385.1
Total Assets	20,703.8	22,007.9	22,194.3	25,082.2	25,403.7	25,271.7
Accounts Payable	9,807.7	9,807.7	9,807.7	9,807.7	9,807.7	9,807.7
Notes Payable/Short Term Debt	2,042.1	2,042.1	2,042.1	2,042.1	2,042.1	2,042.1
Current Portion - LT Debt/Leases	23.6	23.6	23.6	23.6	23.6	23.6
Other Current Liabilities, Total	576.9	576.9	576.9	576.9	576.9	576.9
Total Current Liabilities	12,450.3	12,450.3	12,450.3	12,450.3	12,450.3	12,450.3
Long Term Debt	-	1,400.0	1,600.0	4,700.0	-	2,820.0
Total Long Term Debt	26.2	26.2	26.2	26.2	26.2	26.2
Total Debt	26.2	1,426.2	1,626.2	4,726.2	26.2	2,846.2
Deferred Income Tax	25.4	25.4	25.4	25.4	25.4	25.4
Minority Interest	58.8	58.8	58.8	58.8	58.8	58.8
Other Liabilities, Total	1,058.4	1,058.4	1,058.4	1,058.4	1,058.4	1,058.4
Total Liabilities	13,619.1	15,019.1	15,219.1	18,319.1	13,619.1	16,439.1
Common Stock	616.6	616.6	616.6	616.6	5,316.6	2,496.6
Additional Paid-In Capital	211.1	211.1	211.1	211.1	211.1	211.1
Retained Earnings	6,594.4	6,498.6	6,485.0	6,272.9	6,594.4	6,462.4
Treasury Stock - Common	-337.4	-337.4	-337.4	-337.4	-337.4	-337.4
Total Equity	7,084.7	6,988.9	6,975.3	6,763.2	11,784.7	8,832.7
Total Liabilities and Equity	20,703.8	22,008.04	22,194.36	25,082.32	25,403.80	25,271.82
Altman EM Score	5.7684164	5.663214417	5.649506131	5.469642798	6.008637143	5.656866633
Change in Credit Rating	No Change	No Change	Drop to BB+	Drop to BB+	No Change	No Change

As Shoprite does not currently have a published credit rating, the results of the model were firstly required to derive information regarding the existing credit rating and then used to determine the amount of additional debt available before incurring a down grade in rating.

The model adds additional debt to the balance sheet, and allocates the funds raised over long term investments and inventory based on the assumption that the funds raised would be used for opening new stores in Africa, and that 20% of the funds would be used to increase inventory holdings, while the remaining 80% would be used for site development and infrastructure. The additional interest charge was determined after tax, and reduced profit accordingly effecting the retained profit account in equity. Additionally the current assets are decreased by the amount of the additional interest charge, assuming that interest is serviced annually and not capitalised.

An extract from the model presents the six most relevant scenarios. The first column on the left shows the unadjusted financial statements at the 30 June 2011. These are the most recent published financials before the announcement of the convertible issue. The next two columns show the maximum level of debt available, and the pro-forma results before and after the down grade in rating. The next two columns show how the pro-forma balance sheet would appear if Shoprite were to raise the R4.7bn required using straight debt or straight equity. The last column shows the pro-forma balance sheet from raising the capital using convertible debt. In this scenario it is assumed that 60% of the proceeds would be recognised as debt for accounting purposes and the remaining 40% as equity.

The results are summarised below:

Summary of Results:	Additional Debt	EM Score	Rating
Current Credit Rating	-	5.7684	BBB-
Rating after Straight Equity issue	-	6.0086	BBB
Rating after Straight Debt issue	4,700,000,000	5.4696	BB+
Rating after Convertible issue	2,820,000,000	5.6569	BBB-
Debt Capacity (Investment Grade)	1,400,000,000	5.6632	BBB-

4.2.3) SHOPRITE'S RESULTS:

4.2.3.1) Credit Rating

The results of the model showed that before any adjustment to Shoprite's debt levels, the company's EM Score was 5.77. This score places Shoprite's credit rating in the BBB- range per Altman's 2005 paper. The BBB- rating is significant as it is the minimum rating that achieves investment grade status. Furthermore this rating is in line with the findings of Billingsley and Smith's (1996) paper that convertible issues were typically issued by companies that were at best investment grade or below.

The qualitative adjustments suggested by Altman are briefly considered however in the case of Shoprite these adjustments would cancel each other. In consideration of the company's vulnerability to exchange rate devaluation, the company's major operation remain South African with 79% of total sales originating from the South African business. While the expansion plan indicates that the majority of the capital raised will be used for African development, the bonds are denominated in

rands, and so the company's major operation is largely hedged against this risk. This on its own would not constitute a full notch adjustment from BBB- to BB+.

The second consideration relates to the general industry rating. Retail is typically a highly leveraged business model consisting mostly of current debt where supplier's payment terms are favourable to major retailers. Comparing Shoprite's rating to the general industry average of mid BBB appears to be on par. While Shoprite is BBB-, the comparison is derived from American data. Given that Shoprite is inherently exposed to South Africa's sovereign risk, the industry rating for South Africa is likely to be lower.

While neither of the above constitutes an adjustment in isolation, the combined effect could likely constitute an adjustment downwards of one notch. However the final consideration suggested by Altman is the size, political power and quality of management. Shoprite is ranked as the number one retailer in Africa and was grown exponentially over the last 33 years proving management's consistent quality. This would undoubtedly allow for an increased adjustment to account for these favourable factors.

The accumulation of the considerations indicates that no adjustment to the original rating would be appropriate.

4.2.3.2) Debt Capacity

From the earlier theoretical discussion it was shown that a company must consistently issue equity in order to preserve debt capacity to take advantage of future growth opportunities.

Shoprite's growth opportunities in Africa require the firm to have consistent access to finance, however from the results summarised above it can be seen that Shoprite could only afford to take on R1.4 billion before the company would suffer a down grade in rating. The down grade in rating is significant as it would also result in the company's debt no longer being classified as investment grade, this would have significant yield implications.

The R1.4 billion debt capacity represents only 30% of the required R4.7bn issue and 18% of the total R8bn capital raised.

These results clearly indicate that a straight debt issue would not have been a favourable alternative for Shoprite.

4.2.3.3) Cost of Debt

Corporate debt in South Africa typically trades at a premium to the risk free rate between 1% and 4% depending on the terms of the loan and the credit rating of the issuer⁵⁶. Based on the considerations of this agreement, the related risk adjustments and the determined credit rating of BBB- we would expect Shoprite's corporate debt risk premium to be in the region of 2% to 3%.

⁵⁶ A brief analysis of the corporate bond credit spreads in the South African market is performed in the appendix. The conclusion being that credit spreads range from 100 to 400 basis points. Data for this analysis was obtained from: Ilkova, E and Kershaw, J (March 2012) *Corporate Bond Report*. RMB FICC Research.

The determined risk free rate was set at 7.24%. For the purposes of valuing Shoprite's corporate debt we will consider Shoprite's cost of debt to be in the range of 9.24% to 10.24%. Our base case will use the midpoint in the range at 9.74%.

Using a market yield of 9.74% and a discounted coupon rate of 6.5% we determine the value of the corporate debt as:

Bond Valuation	01-Apr-12	30-Sep-12	31-Mar-13	30-Sep-13	31-Mar-14	30-Sep-14	31-Mar-15	30-Sep-15	31-Mar-16	30-Sep-16	31-Mar-17
Period	0	1	2	3	4	5	6	7	8	9	10
Principal	-1,000,000										1,000,000
Coupon		R 32,500	R 32,500	R 32,500	R 32,500	R 32,500	R 32,500	R 32,500	R 32,500	R 32,500	R 32,500
Total Cash Flows	-	32,500	32,500	32,500	32,500	32,500	32,500	32,500	32,500	32,500	1,032,500
Market Value (Bond)	<u>R 833,522</u>										
Value of Option	<u>R 166,478</u>										

Based on a corporate debt rate of 9.74% the issue value of a one million rand bond with coupon payments of 6.5% is R833,522. The difference between the issue price of the convertibles (R1m) and the bond value is the option value, which is determined at R166,478.

The next step is to value the option using a binomial option pricing model. After obtaining an option value based on this model we can attempt to reconcile the two values, and draw conclusions as to whether there is value in using convertible debt.

5) VALUING THE OPTION COMPONENT:

The financial theory surrounding the valuing of options falls into two major models, the binomial option pricing model (binomial model) and the black/scholes option pricing model (B/S). The black-Scholes equation (Black and Scholes, 1973) is largely derived from the results we see in the binomial model, specifically with regards to the normal distribution of returns. Using a range of similar inputs into a complex formula, the Black-Scholes model is able to price options far with far more efficiently than using the binomial model, which requires more computational resources. The B/S equation makes almost all the same assumptions as the binomial model, however the B/S model assumes that the option being valued is a European style option. This renders the model inadequate to value options with early exercise rights. The product of the B/S equation is to present value the expected value of the option at the exercise date. The prices and probabilities used in this computation are fixed at the exercise date, and cannot interpret the expected value of the option for a range of possible early exercise dates.

The modelling of Shoprite's convertible issue contains early call possibilities after the first three years. Given that the recall provision offers substantial savings to the issuer, it is likely that the issuer will recall the bonds when permitted. In order to value the option with early exercise rights, we need to be able to evaluate the possible pay-offs at each node which is only possible when using the binomial pricing model.

BINOMIAL OPTION PRICING MODEL

The binomial option pricing model was first illustrated by Cox et al (1979)⁵⁷, by creating a hedge. Using arbitrage theory, Cox et al demonstrated that if an investor were to create a portfolio in which he bought the correct number of shares (reflecting the hedge ratio) and sold a call option, the payoff would be identical to the investor whether the share price increased or decreased. This meant that the investor essentially had a risk free return on his investment, as such it should be equal to the risk free rate. By making the return on investment (buying the share plus the proceeds from the call) equal to the risk free rate (under arbitrage theory), one can then solve for the value of the call option.

An example of this is assuming a risk free rate of 5% and that a share that costs R100 could either increase to R115 or decrease to R95. If the investor bought 0.75 (hedge ratio) of the share and sold the call his pay-offs would either be:

- 1) $(0.75) 115 - 15 = 71.25$
- 2) $(0.75) 95 - 0 = 95$

⁵⁷ Cox, J., Ross, S. and Rubinstein, M. (1979) *Option Pricing: A Simplified Approach*. Journal of Financial Economics, 7, pp229-263.

Therefore the return on the investment:

$$\frac{71.25}{0.75(100) - c} = (1 + 0.05)$$

Solving for c , the value of the call option can be determined as R7.143. The illustration shows, similar to the determination of forward exchange rates, that we can derive the value of the call options using two known variables, the current share price and the risk free rate. In terms of the binomial model, the inputs that need to be determined are the 'UP price' (the R115 from the example) and the 'DOWN price'.

The binomial model represents this simple two branch tree expanded over a number of intervals, we then take the final range of expected outcomes and use backward induction to determine the call price.

As can be seen from this illustration, in order to accurately value call options we need to be able to obtain realistic assessments of the upward and downward factors used in the valuation model.

Upward and Downward Factors

The upward and downward factors are determined based on the share price's forecast volatility. The share price volatility is typically referred to as the standard deviation of the stock returns. What this represents is the statistical measure of how much the average stock return deviates from the mean for each period under observation. In order to model the value of the option, we would first need to determine the forecast volatility of the stock. The volatility on an individual stocks return is determined by quantifying the mean return for a determined period and then quantifying the deviations from this mean which accumulates a range of periodic deviations. Because of the high sensitivity of this result on the value of our option, the methodology for quantifying the stocks volatility (standard deviation) is discussed in more detail below. Understanding how volatility is calculated is crucial to the model to the extent that the volatility data needs to be accurately obtained using appropriate calculation periods and making appropriate adjustments to determine forecast volatility. However the model will not attempt to calculate the stocks actual volatility, volatility data will be sourced from Bloomberg's database.

Measuring Returns

$$Return = \log \frac{Up \text{ (or down) Stock Price}}{Current Stock Price}$$

The upward and downward factors are inverses of each other, this is because the factors look at the probability of the standard deviation occurring, and so the likelihood of the upward factor occurring is exactly inverse to the likelihood of the downward factor occurring.

As the probabilities of the upward and downward factors are symmetrical, so too must the returns used to base the measurement of volatility. Stock returns measured as a percentage return on the original price does not achieve this. The issue is best illustrated by way of an example. If a share price moves from R100 to R110, the return is 10%, however when the share moves from R110 to R100 then the return is only 9.91%. The upward and downward returns are not symmetrical. The issue relates to the fact that the base for measuring the return changes from R100 to R110, when

measuring the returns on the option the base is not changing as the value of the option is for the present date (at the current share price). To remove the bias towards upward returns; the returns measured in the volatility calculation need to be determined as the log returns. By taking the log (110/100) the return is 9.53%, similarly the log return of (100/110) is 9.53%. The returns are symmetrical irrespective of whether the return is off a higher or lower base.

The symmetrical returns result in the range of expected values for the call option being normally distributed. This is a critical to the binomial model as it facilitates the assumption that the option returns are normally distributed and therefore allows us to determine the probabilities of the upward and downward factors.

The effect of using log returns further compliments the model as the upward share price increases at an increasing rate, and the downward share price falls at a decreasing rate but never falls below zero. These two effects are more representative of the behaviour of an assets value, upward returns are typically reinvested, compounding the return, and an assets value can never drop below zero.

The returns calculated must be based on a set of share prices with common intervals, such as weekly, monthly or annual share prices. Before calculating the stock price returns, first the dividends declared on the stock during the period of the data must be added back at the date the stock went ex-dividend. The return on each stock price is then calculated by taking the log of the current stock price divided by the stock price for the preceding period.

Variance/Standard Deviation/Volatility

The mean return is then determined to measure the size of each data points deviation.

To calculate the mean return is simply the average of the individual log returns. The variance for each period is calculated as the difference of the actual return from the mean return. The sum of these variances is then rooted, and manipulated into a percentage using the following formula:

$$\text{Standard Deviation} = \sqrt{\frac{1}{(n-1)} (\text{Sum of Variances})}$$

This standard deviation represents the historical volatility of the share price. Option values are based on the expected value of a range of probable outcomes, this requires the model to use the expected future volatility of the share price rather than the historical volatility however practitioners tend to use one of three methods to forecast expected volatility:

- 1) Use the historic volatility as an approximate guide as to the likely behaviour of future volatility.
- 2) Subjectively forecast the expected volatility based on knowledge of the company and the industry, and whether market conditions are likely to result in high or low volatilities.
- 3) Combination, using the historic volatility as a starting point and then make subjective adjustments, or manipulate the data towards more reliable information, that is expected to be more representative of the future.

As the historic volatility will have a large effect on the estimation of future volatility, it is critical to the model that the selection of the historic volatility is appropriate. This will rely largely on how far back the data selection for the historical volatility is extended.

The model for Shoprite's convertible option will contain monthly intervals. The reason for this is firstly the VWAP used to determine whether the conversion price has been achieved is calculated based on 30 trading days, using monthly intervals the model can more accurately map the likely movements of the share price on a 30 day basis. Secondly the convertible maturity is 5 years. While normal distribution returns can start to be seen after ten to fifteen expected values, the model is most accurate when the number of expected values is above forty. Using monthly intervals allows the model to calculate 61 expected outcomes, which will allow for a clear normal distribution to form.

The volatility data sourced from Bloomberg's database was extracted over 250, 750 and 1250 trading days (1, 3 and 5 years respectively). The volatility data was taken over 5 years in the first scenario to match the duration of the convertible security. The shorter scenarios are considered for two reasons, firstly the shorter period of three years represents the earliest time at which Shoprite would be permitted to recall the bonds, and secondly the shorter periods gives an account of the share prices recent volatility, which could indicate a different trend useful for forecasting the future volatility.

The input volatility used in the binomial model is required to be annualised. In theory, the volatility calculated using annual intervals between share prices should be equal to the volatility determined on daily share prices (for the same period), after the volatilities have been annualised. This is true for large sets of volatility data, however due to the fact that the volatility data for this model is only taken over five years, the volatility calculation is based 30 day stock returns (annualised). This is done to increase the accuracy of the volatility input and to keep the volatility data consistent with the monthly intervals used on the model.

Using volatility data that ranges back five years can still raise the concern that the further back the data ranges, the more irrelevant it becomes. Companies could encounter significant changes in their business operations, risk and performance and the most recent historical data ought to be more representative than older data. In response to this the volatility data used in the model has been weighted so that more recent volatilities have a larger impact on the determined volatility input than older volatilities.

Calculating the Factors

Once the stock volatility has been derived, the upward factor is computed using the formula:

$$U = e^{\sigma\sqrt{t/n}}$$

The downward factor is simply the inverse of U. From the formula, T represents the number of years until the exercise date of the option. N represents the number of iterations and σ is the standard deviation of the stock returns.

The probability of the upward (U) or downward (D) factors occurring can be calculated by:

Probability of U = $\frac{(1+(t/n)\times r) - D}{U - D}$. The probability of D is then (1 – Prob.U)

Dividends

The inclusion of dividends received in the model for valuing the option is another crucial component. While the option holder receives no dividend, the declaration of a dividend reduces the share price. When a share price goes ex-dividend the share price drops, all things equal, by the value of the dividend.

The significance of this to the value of the option is that when the share price decreases, the value of a call option decreases. Therefore it is important to account for the expected dividend declared in the model even though the dividends do not accrue to the option holder. Additionally the volatility used to derive the expected values of the option is calculated based on stock returns after adding back dividends. It is therefore necessary to account for the dividends that are expected to be declared in this part of the model.

The dividend that is declared could represent a fixed dividend payout policy or it could follow a payout policy proportional to the value of the share (a fixed dividend yield policy).

Over the long run dividend yields are more stable than fixed dividend payouts. Intuitively fixed dividend payouts have to increase from one year to the next to maintain investor sentiment. This increase will typically move in some proportion to the performance of the firm. While the estimate is crude, the dividend yield does pose as an acceptable proxy to forecast dividend payments.

To account for the effect of forecast dividends in the binomial model, the expected payoff at each node is multiplied by $(1-DY)$. The average interim and final dividend yields over the most recent two years were assumed to be maintained over the 5 year period of the convertible issue. As a result at every sixth node either the interim or final expected dividend yield is applied to the expected values as described.

Additionally the forecast value of dividends is necessary to assess the third condition for forced conversion.

Early Conversion

As discussed at the beginning of this section, the B/S pricing model could not account for the possibility of early conversion. The Shoprite convertible agreement contains the issuer's right to recall and the holders right to elect early conversion.

Similarly the call protection clauses restrict the period after which the call provision may be evoked. The Shoprite convertible issue requires that the convertible has been outstanding for three years and that the VWAP from 20 of the most recent 30 days exceeds the conversion price by 30%. By using the binomial price model we are able to consider the conversion value at each node to determine whether forced conversion would be permissible, or whether a situation exists where the bondholder would rather convert.

Where the company forces conversion, the option is exercised and the conversion value is the expected payoff. The issuer would want to recall the bonds when the ordinary share dividend is less than the after tax coupon payment on the bonds, as they would save on finance payments. The holder would want to force conversion when the ordinary dividend exceeds the coupon (provided the option was in the money) as the holder would increase his return.

The early conversion feature is incorporated into the model by setting various excel formatting rules. The rules identify the three necessary situations for the issuer to force redemption.

Formatting Rules: Recall By Issuer:

- 1) Protection period has lapsed
- 2) Conversion value exceeds the conversion price by 30%.
- 3) The dividend yield on common stock is below the coupon rate (after tax)

Based on the following rules, it was apparent in the model that early redemption is unlikely to be enforced by the issuer. The first expected share price eligible to force conversion (30% premium on conversion price) is anticipated to occur in November 2012, this is well within the protection period and therefore does not trigger conversion. The expected dividend payout is below the coupon payment for a range of dates (looking at the maximum possible outcome, or the top branch of the tree) from inception of the convertible until the 01 August 2013 which also falls within the protection period. The model determines that by the time the protection period has elapsed, the majority of possible outcomes contain dividend yields above the coupon rate and therefore early conversion would not be beneficial to the issuer. This is largely expected as an interim dividend yield of 1% on the required early conversion price of R219 is R2.19, compared to a half year coupon of R3.95.

The result is that early redemption at the option of the issuer, pertains to a small band of nodes. The value of these nodes was adjusted to reflect the conversion value at the time of the forced conversion.

Holder Elects Early Conversion:

- 1) Conversion value exceeds the conversion price
- 2) Ordinary share dividend exceeds bond coupon

As the holder is permitted to elect conversion of the bonds at anytime during the bonds existence, a second model was run, modelling only the early conversion possibility for the holder. From this perspective the holder of the bond would elect early redemption at the earliest stage possible, August 2013, as this is when the price is deep in the money, and the dividend yield exceeds the coupon payment.

6) RESULTS:

The results from the binomial model indicates that the initial option value (excluding the early conversion option) on the convertible issue was approximately R26.45 per share (21% of the share price at issue date). Based on the number of shares available per bond, the conversion feature would be worth R156,564 of the R1 million bond (15.66%).

Early Conversion Option:

After pricing in the early conversion options for both the holder and the issuer, the option value increased to R29.10. The early conversion feature had limited effect on the value of the option due to the short maturity on the convertible. The early conversion benefits are derived through the ordinary dividends differing from the coupon payment, however over a 5 year period, where the first three years are protected against early conversion, the benefit of these dividends is only experienced for two years at a maximum; as a result the impact of the early conversion feature is significantly reduced.

Sweetened Debt Theory:

The results imply that each convertible bond sold at R1 million, represents an option of R156,564 and a straight bond issued at a discounted value of R843,436. Based on the fixed coupon payment of 6.5%, the implied market yield on the straight debt component is determined at 9.24% (pre-tax).

The valuation results shows that due to the additional conversion feature, Shoprite successfully issued five year corporate bonds, at a rate of 650 basis points where the approximate market yield would have been 924 basis points, a discount of 274 basis points. The implied market rate of 9.24% represents a credit spread of 200 basis points above the risk free rate.

Shoprite's debt capacity was limited to R1.4 billion, the use of the conversion feature allowed Shoprite to raise R3.3bn more debt financing than what would be have been allowed by the market before increasing costs of distress.

Delayed Equity:

The tables below show a brief analysis of the setting of the conversion premium. The conversion premium of 32.5% implies that the stock would require a compound growth rate of only 4.69% per year in order to reach the conversion price after five years. Historically, Shoprite's share price has returned a compound average growth rate of 41% (based on the previous 5 years). This puts into perspective the likelihood of the conversion feature occurring and suggests that management's intention for the convertible was to issue a delayed form of equity.

In order for the convertibles to be converted in the first year, the stock price would have to grow at a compound growth rate of 43.77%, but this growth requirement drops to 19.9% for conversion to occur in the second year. While the call protection exists for three years, it demonstrates that at Shoprite's current growth rate, the conversion value would surpass the early conversion premium before 2 years.

Current Stock Value	Conversion	Conversion value	<u>Shoprite Stock Price</u>		
	Premium on Issue	premium on call value	<u>Date</u>	<u>Close Price</u>	<u>CAGR (2008 Base)</u>
	32.50%	30%	30-Mar-12	13437	37%
R 127.50	R 168.94	R 219.62	31-Mar-11	9509	36%
Stock Gain		R 92.12	31-Mar-10	7244	38%
Implied CAGR*:	Conversion:	Early Recall	31-Mar-09	5170	36%
1 year	32.50%	43.77%	31-Mar-08	3815	-
2 years	15.11%	19.90%	(Source: BFA McGregor)		
3 years	9.84%	12.86%			
4 years	7.29%	9.50%			
5 years	5.79%	7.53%			

*Compound Average Growth Rate

Straight Equity Alternative:

Shoprite's alternative to convertible debt was to sell traditional equity to the market. The unique benefit of this situation is that Shoprite sold R3.5 billion of fresh equity concurrently to the convertible issue. For the purposes of quantifying the costs of issuing equity, we can simply consider the price that the equity was sold at to be the value at which Shoprite could attain new equity at the time of the issue.

Shoprite's equity issue consisted of 27.1 million new shares offered at a price of R127.50 per share. The average closing price of Shoprite's shares for the preceding 30 trading days before the announcement was R135.26 representing a discounted issue price of 5.7%.

The convertible issue raised R4.7 billion; issuing 4,700 bonds at a conversion ratio of 5,919 shares per bond. The bond issue had a conversion price of R168.94, representing a conversion premium of 32.5% (R41.44) per share. In the event that the convertible bonds are converted into equity, Shoprite will have effectively raised equity that is worth R1.15 billion rand more than the value they could obtain on a straight equity issue.

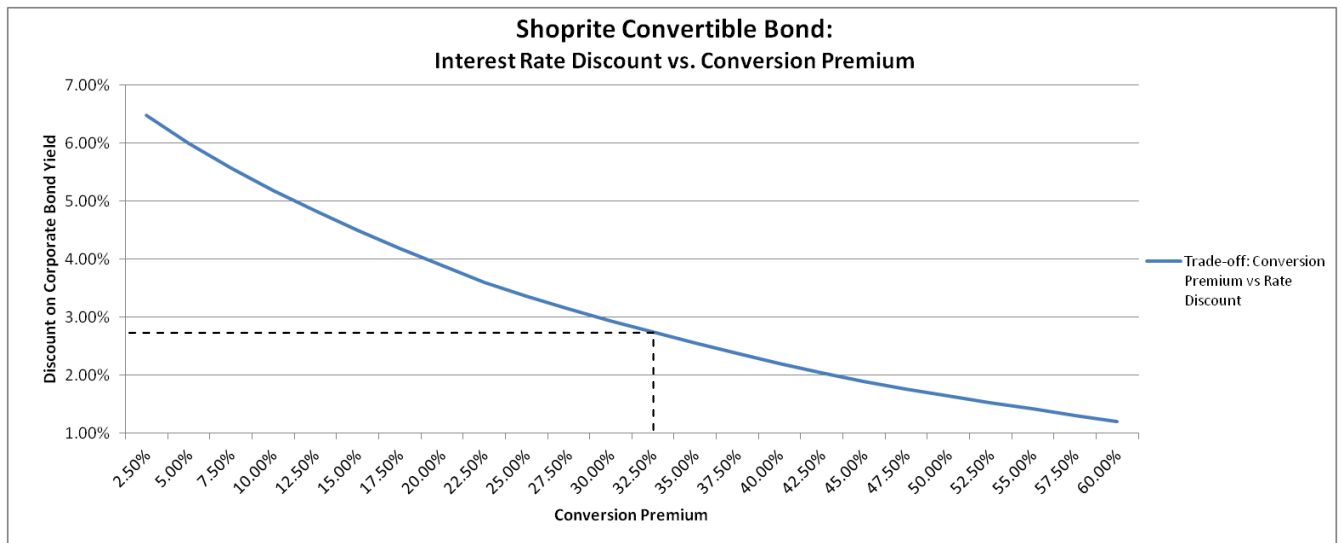
As discussed by Stein. The issue price of new equity is equivalent to making a side bet on the new and existing shareholders. If Shoprite is undervalued given the value of its African growth opportunities, the existing shareholders will lose value to the new shareholders, if new equity is issued. Issuing equity at the conversion premium, earning an additional R1.15 billion is effectively retaining value for the existing shareholders. The size of the saving amounts to approximately 1.5% of the company's current market capitalisation.

Conversion Premium:

The convertible issue has shown significant cost savings both on the side of the effective cost of debt and from the perspective of delaying the equity issue to retain more value for future growth opportunities for existing shareholders. The value in the convertible issue was driven by two factors, firstly the extent of the conversion premium, and secondly the extent of the discount on the cost of debt. These two factors are linked in a trade-off. The higher the conversion premium set by the company, the more value that is retained for existing shareholders in the delayed equity issue. However the greater the conversion premium, the lower the likelihood of the conversion feature

converting, as such the value of the option decreases and similarly the discount received on the market yield of the debt component decreases.

This trade-off is captured in the graph below:



The setting of the conversion premium is critical to maximising the value of the convertible issue for companies. At low conversion premium levels, the likelihood of conversion is much higher and therefore the discount received on the coupon payments would be greater. The graph above represents this trade off, the dashed lines representing the Shoprite's actual bond terms, a conversion premium of 32.5% and a discounted coupon yield of 274 basis points (a coupon of 6.5% on a market yield of 9.24%). As can be seen from the graph, at low levels of conversion premium, an increase in the premium results in a relatively smaller decrease in the discount received on the debt. This drop in the discount, for every 2.5% increase in premium, occurs at a decreasing rate. This can be seen with the higher conversion premiums, the same 2.5% increase results in a relatively smaller drop in the discount on the credit spread.

The setting of the conversion premium also requires consideration of the market. The company needs to set a conversion premium that is likely to be fully subscribed by investors, while maximising the value of the delayed equity and sweetened debt benefits to the company.

Volatility vs. Cost of Debt:

The theory surrounding convertibles suggested that while a firm with increased volatility would benefit from the increased value of the convertible option, the erratic cashflows that causes the higher volatility also suggests that the firm is more risky, and therefore the cost of debt to the firm is higher. It was considered earlier whether the effect of the increase in volatility on the firms option price would outweigh the effect of higher volatility on the firms cost of debt.

In the case of Shoprite it can be seen that for every 2.5% increase in the volatility used in the model, the option value increases by an average of R14,584 where as the cost of debt increases by an average of 40 basis points. To compare the costs in absolute terms, the incremental debt cost is multiplied out by R1 million, to determine the addition coupon that would be paid per year, and present valued for 5 years. The incremental debt cost in present value terms, averages at R14,469 for volatilities between 5% and 30%, and averages at R14,919 for volatilities between 30% and 60%.

In comparison the average increase in option value for the same volatility sets are R15,287 and R13,998 respectively.

This demonstrates that while companies in general (and particularly in the case of Shoprite) stand to benefit from higher volatilities, there is a tipping point at which higher volatilities achieve decreasing benefits to the company. For Shoprite, this tipping point comes at a volatility between 30%-32.5%. This tipping point again draws attention to the careful engineering required in setting the appropriate conversion premium. The conversion premium needs to be set in such a way that the 'tipping' volatility (before the cost of bankruptcy outweighs the marginal value of the option) is only slightly higher than the actual volatility. If the conversion premium was set too high, the actual volatility would be too far from the 'tipping' volatility and the market would not take up the issue as the likelihood of conversion would be too low, if the conversion premium was too low, Shoprite would be passing too much value to the bondholders.

Reconciliation of the Debt Yield to Option Value:

Using the results from the credit spread approach and the binomial option pricing approach we can reconcile the results of the two approaches to identify to what extent the option values corroborate each other.

Under the credit spread approach, the option value for a R1m convertible bond was determined as R166,478 using a debt yield of 9.74%. For a range of yields from 9.24% to 10.24% the option values ranged from R147,168 to R185,237 as is shown in the table below.

Range of Corporate Yields	Implied Option Value	Implied Volatility
9.24%	147,168	27%
9.34%	151,072	27.65%
9.44%	154,955	28.35%
9.54%	158,817	29.10%
9.64%	162,658	29.75%
9.74%	166,478	30.50%
9.84%	170,278	31.20%
9.94%	174,057	31.90%
10.04%	177,816	32.60%
10.14%	181,554	33.30%
10.24%	185,273	33.95%

Using the option values determined under the credit spread approach, the binomial model can be used to obtain the implied volatility of these option values by working backwards. Holding the option value constant and solving for the volatility we see that the range of implied volatilities is between 27% and 34%. Additionally it is noted that a one percent increase in the market yield for debt translates to approximately 7% increase in the implied volatility.

Based on the volatility data from Bloomberg, the actual historic volatilities are displayed below. The data represents the 30 day volatility over 250, 750 and 1250 trading days (1, 3 and 5 years respectively).

Volatility Data Summary		Volatility (%)	Implied Kd
Average:	1 year	24.25	8.83%
	3 year	23.84	8.77%
	5 year	28.27	9.42%
Weighted:	1 year	24.72	8.90%
	3 year	23.33	8.70%
	5 year	24.62	8.89%

From these results there are two possible inferences. The first is that the cost of debt determined in the credit spread approach is too high, in order to achieve a volatility in line with Bloomberg data, the corporate debt yield would have to be between 8.7% to 9.4%. However the second interpretation of the results could be that the Bloomberg data only reflects the historical volatility. The market could be forecasting volatility of the share price to be higher than its historic volatility over the next five years.

Using the binomial model, forecast volatility was set at 27.00%. The reasons for using this volatility was predominantly based on historical volatility and future economic forecasts. Shoprite's volatility was highest before the 2008 credit crisis. Since the crash market uncertainty has resulted in less trading and particularly investors holding safer stocks. As Africa is expected to emerge from the economic recession over the next 5 years the market may be forecasting a higher volatility for Shoprite over this period, while not quite reaching the levels of 2007 and early 2008.

Using a volatility of 27% implies a cost of debt of 9.24% which falls into the lower limit of the corporate debt yield. Based on this evidence it is concluded that Shoprite's corporate debt rate was valued by the market at 9.24%, while the coupon paid on the convertible was only 6.5% offering Shoprite an overall discount on their cost of debt of 274 basis points per year on proceeds of R4.7bn. This equates to cost (and cashflow) savings of R128.83m per year, the present value of these savings over 5 years is R533m.

This clearly illustrates the cost saving potential of convertible debt. Comparing convertible debt to straight debt, Shoprite were able to achieve significant savings from an interest perspective. However had Shoprite used straight debt, it might have been able to raise equity after 5 years at a significantly higher share price to the conversion price set in the conversion issue. In this case straight debt would have more beneficial over convertibles based on the higher value of the equity raised. The argument to this point is that Shoprite did not appear to ever have the option to raise straight debt, Shoprite's capital structure was so highly geared that their maximum debt capacity was limited to approximately R1.4bn in additional debt, R3.3bn short of their capital requirements.

6) CONCLUSION:

The results from this analysis provide strong evidence that there is substantial value to be gained through the use of convertible bonds.

The objectives of this paper were to answer the following two questions: 1) Why did Shoprite issue convertible debt in place of traditional debt or equity and 2) what were the cost savings of doing so?

In response to the first question, Shoprite has shown a history of aggressive growth since their incorporation and has continuously exhausted its finance through acquisitions. As discussed in the review of the theory, companies are required to continually manage the equity levels within their capital structure. Shoprite's rapid growth has put strain on their capital structure as is clear from the Altman EM Score results, the group only has a further debt capacity of R1.4 billion (1.5% of the firms market value). Furthermore the groups credit rating is determined to be around the level of minimum investment grade. The financing of the groups future prospects through issuing debt does not appear feasible, as it would come at the cost of becoming significantly more risky (below investment grade). Additionally should more growth opportunities arise in the future, as expected, the group will have exhausted all of its debt capacity, forcing it to issue equity. It appears then that the groups real financing options were between straight equity, or convertible debt.

Shoprite's exposure to Africa creates large, potentially very valuable, growth opportunities for the group. It suggests that an equity issue would have not been beneficial to the existing shareholders of the group, passing on substantial value to the new equity holders, diluting the stock.

The group's clear need for equity, and the favourable conversion premium set suggests that the conversion issue was intended to be a delayed form of equity. The conversion premium implies a required compound growth rate of less than 5% over five years, from a share that has historically achieved 40.5% annual compound growth (over the past five years). While issuing the bonds at a conversion premium of 32.5% was able to retain R1.2 billion value for existing shareholders.

Further indication of the companies need for equity is the introduction of Walmart. The group will be required to have far greater debt capacity in the face of strong competition, allowing the group to sustain price wars, and make faster acquisitions of prime opportunities to maintain its first mover advantage.

In response to the second question, Shoprite was able to achieve substantial financial gain by issuing convertible debt over equity, while maintaining the strategic advantage that was required from equity. As mentioned above, the convertible issue (if converted) will result in the group issuing equity at R1.2 billion more than it could have using a straight equity issue, while further benefit was achieved through the discounted coupon.

Based on the crediting rating, the credit spread on the risk free rate and the implied bond yield on the convertible issue; Shoprites cost of debt is estimated to be in the region of 9.24%, while the coupon rate offered on the convertible issue was significantly lower at 6.5% (a 274 basis points discount).

It is noted that had the group issued straight equity, the dividend yield paid would have been in the region of 2%, 450 basis points below the coupon rate (although only 268 basis points below the after tax coupon rate paid). The benefit of paying out finance costs 450 basis points (or 268bp after tax) lower than the coupon rate would only accumulate to the value of issuing equity at R1.2 billion after 22 years, by which time the dividend yield is expected to have exceeded the coupon (however the convertible only has a maturity of five years) as a result the benefit of the lower dividend yield would never outweigh the benefit of issuing the equity at a premium of 32.5% for Shoprite.

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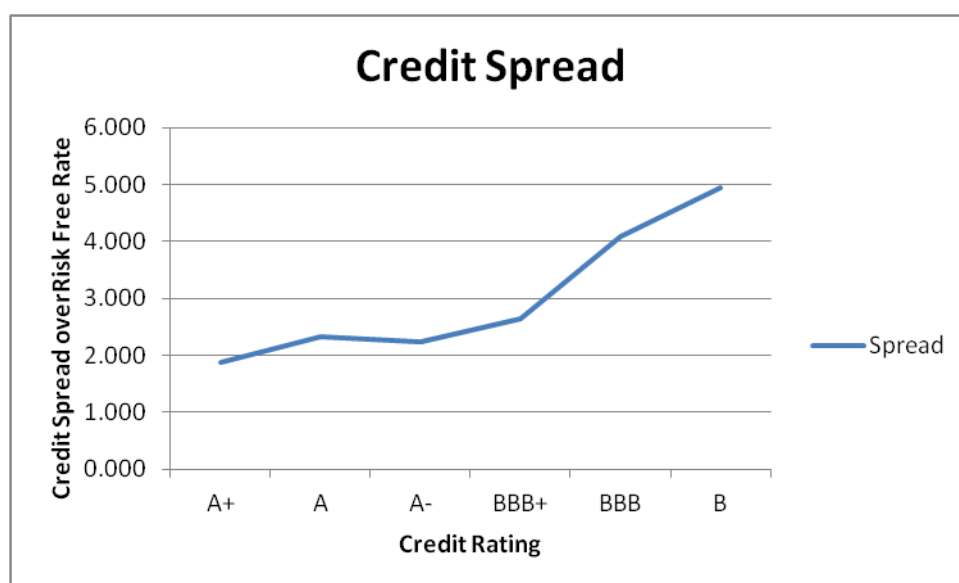
7) APPENDIX: ANALYSIS OF SOUTH AFRICAN CORPORATE BOND CREDIT SPREADS

Below is a brief analysis of the corporate bond credit spreads, as based on market yields as at the 31 March 2012. The corporate bond yields were obtained from the RMB corporate bond report (March 2012). An extract for the more comparable corporate bonds were selected and matched to the risk free rate of either a 3, 4 or 5 year government bond (as per Bloomberg data).

The determined credit spreads are reflected below. The results show that credit spreads for investment grade companies range between 100 and 400 basis points.

Rating	Issuer	Issue Size (Rm)	Maturity	Coupon	MTM (%)	Risk Free	Spread
A+	MTN	1250	13-Jul-15	9.360	8.085	5.985	2.100
A+	MTN	1250	13-Jul-17	10.130	8.905	7.244	1.661
A	Sappi	500	28-Jun-16	9.630	8.900	6.665	2.235
A	Telkom	1160	29-Apr-15	11.900	8.835	5.985	2.850
A	Imperial Group	1500	28-Sep-17	9.780	9.150	7.244	1.906
A-	Unitrans	200	06-Apr-15	8.600	8.600	5.985	2.615
A-	Unitrans	150	19-Apr-16	7.846	7.850	6.665	1.185
A-	Unitrans	250	22-Sep-17	10.160	9.790	7.244	2.546
A-	Phaello Finance	200	06-Apr-15	8.600	8.600	5.985	2.615
BBB+	RCS Investment Holdings	300	15-Jul-16	9.301	9.300	6.665	2.635
BBB	Infrastructure Finance Group	650	15-Mar-15	8.900	9.835	5.985	3.850
BBB	Infrastructure Finance Group	160	30-Apr-15	11.946	11.950	5.985	5.965
BBB	Infrastructure Finance Group	250	01-Feb-16	9.096	9.100	6.665	2.435
B	Edcon	1010	04-Apr-16	11.850	11.600	6.665	4.935

Summary: Average Spread per Rating	
Rating	Spread
A+	1.881
A	2.330
A-	2.240
BBB+	2.635
BBB	4.083
B	4.935



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